Single Copies 10¢
Subscription rate $3.50 per yr. in U.S.A. and Mexico (U.S. money)
$4 in Canada
$5 in foreign countries
Trade Mark reg. U.S. Pat. Off.
Members of Audit Bureau of Circulations and Associated Business Papers, Inc

NATIONAL PETROLEUM NEWS

Branch Offices:
LOS ANGELES
Petroleum Securities Building
TULSA
World Building
NEW YORK
342 Madison Avenue
HOUSTON
614 West Building
CHICAGO
35 Wacker Drive

Published by the National Petroleum Publishing Co., MAIN OFFICE - 1213 W. 3rd St., Cleveland, Ohio. Copyrighted 1927.

Vol. XIX Cleveland, Ohio, October 26, 1927 No. 43

More Study on Gas Conservation Needed, Engineers Tell Institute

By Lawrence E. Smith
N. P. N. STAFF WRITER

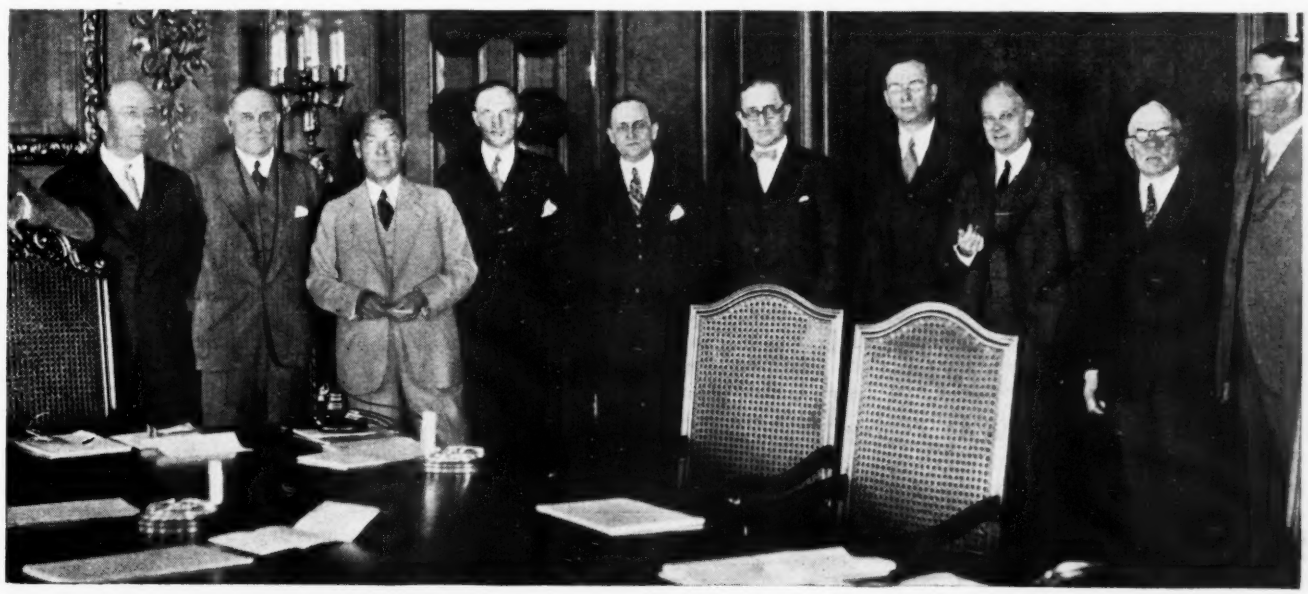
TULSA, Oct. 22

AT THE conclusion of the three-day meeting in Ponca City, Oct. 17-19 of the technical subcommitteemen selected by the American Petroleum Institute committee on gas conservation, one achievement was obvious to all.

Engineering talent of the oil industry had, for the first time in a broad way, met and exchanged views and data on a question of great economic importance to the oil industry, encouraged so to do by their executives.

Discussion was free and submission of data as full as time would permit. The method adopted to bring out the opinions of the engineers and the facts upon which there is agreement was to put the technical men on the witness stand, ask questions and cover as fully as possible the debatable points. Not only the members of the A.P.I. committee but anyone in the audience of more than 100 was at liberty to ask questions or to volunteer information on the points under discussion. The rule was adopted that newspaper men might listen and write of the discussion, but were to omit names. This rule made for frankness of statement.

The broad question at issue is this: Shall the American Petroleum Institute endorse the principle of legislation to effect the conservation of gas as an agency for increasing the yield of oil?



Members of the American Petroleum Institute committee on gas conservation and others who met with them, photographed in the board of directors room of the Marland Oil Co., Ponca City, Oct. 19.

Left to right: W. S. Farish, president, Humble Oil & Refining Co.; L. P. St. Clair, vice-president, Union Oil Co. of California; E. W. Marland, president, Marland Oil Co.; W. H. Ferguson, vice-president, Continental Oil Co.; W. R. Boyd, jr., assistant secretary and counsel, American Petroleum Institute; Henry McGraw, vice-president, Gypsy Oil Co.; R. L. Welch, secretary and general counsel, American Petroleum Institute; James A. Veasey, general counsel, Carter Oil Co.; E. W. Clark, executive vice-president, Union Oil Co. of California and president of the American Petroleum Institute; D. R. Richardson, general counsel, Marland Oil Co.

Messrs. Marland, Farish, St. Clair, and McGraw are members of the A. P. I. committee. Member J. Edgar Pew was present at the meeting but is missing from the picture. Mr. Ferguson represented Committeeman S. H. Keoughan. Committeeman T. A. O'Donnell was not present.

This question is politico-economic. Its answer is in the hands of the corporation chiefs who utilize the A.P.I. as a forum for the discussion of their common problems; but these executives must base opinion upon what is the experience of the industry and such experience is usually certified by the engineer, geologist, chemist and physicist. Upon the data they assemble conclusions as to best procedure are formed.

The technical men appointed on these subcommittees had little more than 30 days to make their reports to the Ponca City meeting. For that reason, there was a general feeling that the study begun should be regarded merely as the start and that much more time should be given to its completion. In response to this, the four regional subcommittees resolved through their members who were in Ponca City, to continue the work as a permanent organization. Earl Oliver, of Ponca City, who had served as general secretary, was elected general chairman and will carry on in this capacity the secretarial work as well.

Possibility is seen that, through the A.P.I., a division of production engineering may be established, starting out with these four subcommittees as its nucleus. This may be determined at the Chicago meeting of the Institute in December.

The technical men met on Monday, continued their discussion throughout Tuesday and part of Wednesday, although many of them left Tuesday night to attend the mid-year meeting of the Petroleum Division, American Institute of Mining & Metallurgical Engineers in Fort Worth. On Wednesday, the A.P.I. committee on gas conservation, of which E. W. Marland is the chairman, held closed session. This committee last January submitted a resolution to the executive committee of the Institute endorsing the principle of state legislation. This resolution was considered by the executive committee in May, but no action was taken except to ask the conservation committee to continue its study.

The creation of the technical subcommittees for the Mid-Continent, California, Rocky Mountain and Texas-Louisiana regions was to develop the exact data, as nearly as possible, on the importance of gas and the best means of utilizing its energy in lifting oil in the well and in effecting a more complete drainage of oil from the sand to the well.

Now, engineering knowledge of the function of gas in producing oil is by no means complete, not even adequate to settle such a broad question as what is the proper kind of political law to compel best utilization. The data on the function of gas is like that on astronomy. Every day something new is developed which destroys some previous concept and adds a dot to the map of the heavens. The interstellar spaces are yet very large but they have not been filled because the astronomer doesn't know what to put in them.

Here and there over the country, a few men have really studied the function of gas in moving oil. Some of their conclusions have been made public, but the map of the subject as yet has no boundary nor is it more than tentatively surveyed. Some of the gaps can be bridged by the liberal study and exchange of the information that exists in the minds of the technical men and in the production records of the companies. Many of them will have to be filled by original research.

A practical view of the Ponca City meeting is that it is merely a good start toward something. It didn't develop the answer to the question of proper procedure in developing an oil field. It didn't settle the debate on voluntary unit operation, compulsory unit operation, adherence to uniform system of producing under a definite oil-gas ratio, or compulsory repressuring of an oil sand in the initial stages of production. The engineers wouldn't be expected to settle the legal questions and this was asserted by several of them when the cross examination led into such channels.

There was much discussion, for example, of what to do with a man who owned an acre lease in the middle of a field, or rather, on the highest part of the structure. It was assumed that all other operators in the field desired to follow the best practice, producing their oil in such manner as to make most effective use of the gas pressure, but their program was threatened by his operator who would drill, probably, an uneconomic well and compel a number of offset wells to be drilled all around him.

Many opinions were brought out and the discussion was lengthy on this point. Some contended that the neighboring operators might well buy this lease, even at an exorbitant price, not alone for the saving they would effect in drilling, but in preserving the scheme of operating they had set up. Others believed that a pooling of interest in some manner with this man would be the solution, while some veered to the view that some form of compulsion—some statutory authority—should exist to bring the owners of the small lease into line with good operating practice.

A viewpoint expressed by one was that there may come, with further research into the subject of the function of gas, a changed concept of the property rights in oil and gas. There is now an unbroken line of court decisions to the effect that oil is a fugitive substance which becomes the property of the man who can take possession of it. The courts have so held because they didn't know what else to do—that was the most practical way of settling the question brought before them, many oil men believe. The idea, advocated merely as speculation in the Ponca City meeting, was that, if it can be established by data that is undisputable, that natural gas which comes from a well with oil should be regarded not as a separate substance from the oil but as the force that causes that oil to drain into a well, a new line of reasoning may be set up that will have, through adoption by the courts, the force of law. The practical

Gray Suggests Sounding of Industry's Sentiment on Legislation

TULSA, Oct. 24.—W. H. Gray, president of the National Association of Independent Oil Producers, in a letter to E. W. Clark, president of the American Petroleum Institute, doubts that a majority in the oil industry desires legislation regulating production. Mr. Gray suggests that, before Mr. Clark acts on the recent suggestion of Secretary of the Interior Work to appoint three members representing the oil industry on a committee of nine to study and draft a measure for submission to the Federal Oil Conservation Board, the American Petroleum Institute determine the sentiment of the industry on legislation. The letter to Mr. Clark, dated Oct. 22, follows:

"I am informed through the press that Hubert L. Work, Secretary of the Interior, on behalf of the Government, requested you to appoint three representatives on a committee of nine to draft regulatory legislation.

"My knowledge of the sentiment of the rank and file of the industry with respect to regulation forces me to doubt that any goodly number desire it. Therefore, if I may be privileged to do so, I would suggest that before appointing any members of the committee mentioned, you secure from the members of the industry, by an open discussion, an expression of their wishes in the matter. For myself and those who follow me, I will say that, at this time, we are opposed to any kind of regulation but if there must be regulation it must and will sweep clear across the entire field of activities within the industry."

(Signed) W. H. Gray, President,
National Association of Independent Oil Producers.

value of such change in the reasoning would be the ability to assert claim to the energy value of the gas in a pool, regardless of whose lease the gas came from, and the ability to defend this property right against the man who would so produce his oil as to dissipate this energy.

Leaving out the question of what the A.P.I. committee on conservation will do, upon what points are the technical men agreed? As developed in the open discussion at Ponca City, there is concord of thought on the question that gas is of prime importance in the recovery of oil, and that it is the chief, natural expulsive force. There is agreement that the gas dissolved in the oil reduces the surface tension of the oil, reduces the viscosity, which in turn reduces the friction of the oil as it passes through the sand.

It is agreed that, when the gas dissolved in the oil is reduced as a result of the reduction in rock pressure, the viscosity of the oil is increased, friction is greater and the ultimate production of oil is lessened. Data are available to show that where gas is efficiently used as lifting and propulsive agency, there is longer flowing life of a well and, hence, more economical production.

The petroleum engineer, it was generally asserted, should be given the task of finding out the best way to utilize the native gas pressure. There can be no formula set up that will be equally applicable to all fields, or even to all wells in a field. Furthermore, conditions change during the life of the well so that changes must be made in the methods employed.

Present day methods seek to make effective use of gas energy by keeping the ratio of gas to oil as low as will be possible in getting paying recovery. To effect this, attention is paid to the size of the tubing used and the depth at which it is set; to pressure control on the well; to gas and air lift; to installation of the best design of pumping equipment; to repressuring with air or gas and to proper spacing of wells. There was pronounced opinion in the Ponca City meeting that the industry would have to become more cooperative in its production practices before most effective use of gas pressure could be made and before the best programs of well spacing and rate of development could be adopted.

Bearing upon the politico-economic consideration with which the industry is concerned, one of the technical men advanced a new idea. He said that his preliminary studies have convinced him that it will be possible in time to arrive at a factor which will control the production of oil and that this will be a decline factor. That, briefly stated, the time may come when an operator will be permitted to produce, cumulatively, so many barrels of oil per unit of decline in pressure. The rule would vary from field to field, perhaps from well to well, but an average may be established from the data now available which would be helpful in setting up a general working plan. A study of this character can be greatly advanced if oil companies will permit the free exchange of information on the productivity of wells and the manner in which they were operated, the speaker said.

Opinion varied at the Ponca City meeting as to the best means of handling the operator who will not do his work efficiently. One eminent technologist drew the above cartoon as suggesting one way to deal with that type of operator

There has been a hastening of co-operative effort in producing oil within the past five years, several speakers asserted, and particularly within the past two years has the tendency toward joint effort been noted. Companies are exchanging information more freely, are uniting in finding and developing fields and generally show a spirit of willingness to unite in making their operations more efficient and economical.

Several times the question was asked of one "witness" or another by various committeemen whether legislation will not be required to effect the proper kind of co-operative effort—to take care of the unenlightened or obdurate operator who would so produce his property as to dissipate for everyone in the field the gas energy. The answers varied. Some contended that revision of the laws, statutory and court interpretative, on property rights in oil and gas and revision of the present lease contracts, would be necessary before a great deal could be done. Others held that it would be far better for the industry to go along trying to improve its practices and to acquire more information on what it wants to do before urging the governmental agencies to act.

"In some old fields," said one speaker, "a great deal has been done in establishing voluntary unit operation of properties. This came through necessity—the operators were not making a profit. I don't know how it would work in new fields.

"I think unit operation would be a fine thing if the industry were ready for it but it isn't and I don't believe in stirring up the whole mess and getting laws passed. We don't know enough about what we want to do."

The meeting of the Institute committee on gas conservation was devoted to discussion of the material that had been submitted to the meeting by the engineers, but, it is understood, no formal action was taken. Each member of the committee will be given a copy of the record of the meeting and probably a copy will be given to Charles Evans Hughes, who is counsel to the committee.

Of the Institute committee the following were present: E. W. Marland, chairman, president of the Marland Oil Co., whose organization was host to the meeting; W. S. Farish, president of the Humble Oil & Refining Co.; L. P. St. Clair, vice-president, Union Oil Co. of California; Henry McGraw, vice-president, Gypsy Oil Co.; J. Edgar Pew, vice-president, Sun Oil Co. W. H. Ferguson, vice-president of the Continental Oil Co. represented Committeeman S. H. Keoughan, president of the Continental. The seventh member of the committee, T. A. O'Donnell, chairman of the board of the California Petroleum Corp., is in Europe.

This committee adjourned to meet again in Chicago Dec. 2, which is four days before the opening of the annual convention of the Institute.

Governor Steps in as California Companies Seek to Save Gas

By William E. Green
N. P. N. STAFF WRITER

LOS ANGELES, Oct. 22

GOVERNOR C. C. YOUNG of California announced on Oct. 19 his decision to name a committee of five to make a study of the "wastage" of natural gas in the state.

The alleged waste of gas is practically all in the Ventura Avenue field where the rock pressure is very strong and the production of gas in the old wells apparently has a longer life than in any other California field. The companies operating in this field have long been voluntarily studying the situation in the effort to work out means of cutting down the waste and at the same time keep from killing exceedingly expensive wells. The companies have been working with the advice and counsel of the oil and gas department of the state mining bureau.

The need of such a committee is doubted by oil company executives unless it will be possible for the committee to assist in finding a profitable use of the total amount of gas produced in the state. One executive remarked that the real solution of the problem was the building of a gas line from Ventura county to San Francisco and nearby cities in the northern part of the state, so Natural gas could be used in place of the artificial product now sold at a price in excess of what the natural product could easily be sold for.

The committee mentioned will not be completed until next Monday, when the Railroad Commission will name its representative. Probably a call for a meeting between the governor's committee and oil company executives will then be issued.

The oil-gas ratio in the Ventura field is greater than in any other field. This problem has faced the oil companies during the life of the field. The situation is now greatly improved over a year ago, and further improvements are noted from month to month as experiments, constantly carried on, show the way to further conservation of the gas.

Due to the strong rock pressure it has been found that it is impossible to force back into the formation the gas not needed, after it has been stripped of its gasoline content. One company found that under 1200 pounds pressure the formation would not take the gas that was being forced down the hole.

The idea of shutting in completely the flowing wells at Ventura Avenue has been found to be very dangerous, and in fact it is practically certain that most of the wells so treated would be killed. During the recent shut-in at Ventura Avenue the Associated's Lloyd 20 was pinched in too much, and the well went dead.

It required considerable work to bring it back, and it is doubted if it will ever be as good as when permitted to flow without the treatment accorded it. Associated's Lloyd 8 was good for 250 barrels, but when pinched in too much went dead. It has not yet been possible to bring the production back. These instances and others have made the oil companies fearful of any heroic action. The wells at Ventura Avenue cost too much to drill to run such risks.

There are eight natural gasoline plants at Ventura Avenue. These plants in September ran 6,500,000,000 cubic feet of gas and extracted 6,600,000 gallons of natural gasoline. The total production of natural gas is only slightly over the total amount run through the plants. In fact, the difference is too small to mean anything. The Shell Co. has a plant in the field that can run better than 100,000,000 cubic feet of gas daily, and the Standard Gasoline Co. is now arranging to build another plant in the field.

If a line was built to San Francisco, a distance of some 300 miles, practically all of the gas available to Ventura Avenue could be utilized profitably.

The proven area of the Ventura Avenue field is about 3½ miles east and west and about ¾ miles north and south, with certain of the adjoining territory still unproven. Very heavy drilling mud is used to hold back the extremely high gas pressure. All wells are beaned or pinched back to save as much gas as possible. The new wells usually come in with a tubing pressure ranging from 320 to close to 500 pounds, while the casing pressure is seldom under 1000 pounds, and sometimes exceeds 1200 pounds.

Practically all of the wells are drilling below 6000 feet and many times exceed that footage. Seven thousand foot holes in the near future are to be expected. More than 1000 feet of oil bearing formation are penetrated in practically every well.

Nicholas to Drop I.O.M.A. Work Next Spring

(By Telegraph)

CHICAGO, Oct. 25.—Announcement by L. V. Nicholas, president of Independent Oil Men of America, that he would not hold office after next March came as a shock to the 250 members assembled at Congress Hotel here in the first convention since the consolidation of I. O. M. A. with its parent organization in Chicago last spring. Questioned as to whether he might be drafted, directors say he accepted the office only upon a promise from them that he would not be asked to serve more than a year.

Colonel E. H. Helpp, Kentucky Consumers Oil Co., Louisville, delivered the address of welcome Monday afternoon offering considerable organization history and predicting at the close of his talk that membership in I. O. M. A. would be worth $2,500 cash within two years.

The spirit of President Nicholas' address was practicality. He used the figure of a skyscraper being built, saying it required more time getting down to bedrock and laying solid foundations than building many stories above ground. He declared the ground work on I. O. M. A. done and the slowly prepared program ready to make a showing that would increase in size and importance every year.

Ray Overholser, assistant to the president, made the keynote address, pointing out progress over the five years the Spread Red Eagle has been a registered trade mark. The house applauded after he told a dozen or more things the member jobbers were able to do today through their organization that they could not have done at all five years ago, notably pass business from one to another through the coupon interchange, enjoy the prestige of a nationally known brand, capitalize on their independence, profit by mutual friendly criticism and made it profitable for independent refiners to join in the movement.

All the speakers on Tuesday's program were on hand Monday. John McE. Ames, president of Kanotex Refining Co., is first on Tuesday's program. He will be followed by Harry Brownell, of the Brownell Corp., Sioux Falls, S. D., designated on the program as the mystery speaker to discuss organization. Theodore A. Peck, lubrication engineer, and C. Y. Hinhey, advertising man, both of the association's staff, will occupy the platform Tuesday afternoon.

Hill Clutch Machine & Foundry Co., Cleveland, announces that its metropolitan New York district office is in charge of Charles C. Phelps, sales engineer, with offices at 30 Church St., room 528.

Left to right—J. B. Belk, Albemarle Oil & Gas Co., Charlottsville, Va., president of Virginia Independent Oil Men's Association; P. S. Ford, O. D. Ford Motor Co., Martinsville, first vice-president; R. V. Van Horn; Clifton Forge, chairman of the association's board of directors, and W. M. Eller, City Point Terminal Co., Petersburg, secretary and treasurer

Virginia Marketers' Code of Ethics Designed to Apply Nation-Wide

By Roger B. Stafford

N. P. N. STAFF WRITER

NORFOLK, Va., Oct. 21

JOBBERS of Virginia, assembled here yesterday and today for their annual convention, and representatives of the large integrated companies who attended the meetings of the Virginia Independent Oil Men's Association, were told that a code of ethics to govern the conduct of gasoline and oil distribution in this state would be ready for publication shortly —perhaps in two or three weeks.

It had been expected that the code would be promulgated at this convention, but the Federal Trade Commission and the U. S. Department of Justice have yet to pass on it. Assurance has been given the oil men's committee that the federal bureaus will soon grant some sort of approval for this proposed decalog for marketers.

The committee which has been working on the code since last May when the Federal Trade Commission called a meeting of Virginia gasoline and oil distributors in Richmond, is pledged to secrecy and not even members of the Virginia association were apprised of the contents of the code.

William Thompson, district manager for The Texas Co., with headquarters at Norfolk and a member of the code committee, in reporting that the results of the committee's all-summer work were now in the hands of the trade commission, said the committee worked to draft a set of working rules for the distributing division of the oil industry in the whole country and not for Virginia alone. In other words, he indicated that all sorts of trade abuses were covered and frowned upon in the Virginia code.

The presence at this meeting of representatives from the jobbers' associations of North Carolina, Tennessee, Alabama and Ohio proved the interest in other states in the effort in Virginia to bring about better marketing conditions.

Mr. Thompson said considerable difficulty had been encountered in drafting the code, citing the fact that many trade abuses that had crept into the industry several years ago had since become trade customs. He said that concessions had been given so freely by the marketing division that a man who wanted to open a filling station no longer needed a shoestring. All he required was an idea he should operate a filling station. The oil company, informed of the idea, would build him a station, install the latest types of equipment, pave the drives with concrete, stock the place with gasoline and oil, and extend him $1,000 credit to buy tires because the tire manufacturers wouldn't give him credit.

E. A. Holbein, vice-president, Stand-Oil Co. of New Jersey, is another member of the code committee.

MR. HOLBEIN was not present but J. M. Graves, district manager for the Standard of New Jersey at Norfolk, said his company was in accord with the movement and would like to see business built only on able salesmanship and quality of product.

The trade abuses which have been complained of and which led to the calling of the Richmond meeting in May by the trade commission include; free installation of pumps and tanks; lending of money for construction of buildings, canopines; driveways and toilets; advertising rentals by which a dealer is paid for the space an oil company's sign occupies; rebates; coupon books at large discounts; discriminatory prices in favor of some dealer or consumer; paying of dealer's ground rental, or renting of dealer's station at a price in excess of the true market price; wide differentials below the tank wagon price when the dealer trucks the gasoline from the jobber's or refiner's bulk plant; unsound credit extension to consumers, and the giving away of oil or other things on opening or bargain days.

It was the concensus of many jobbers here, although not expressed at the meeting, that it is well to supply the dealer with gasoline pumps and tanks, and motor oil outfits so long as the dealer sells through them only the products of the jobber or refiner who lends the equipment. It was the opinion, however, that such lent equipment should be confined entirely to gasoline and motor oil equipment and should not include air compressors, pneumatic or hydraulic lifts, air and water towers, or any unusual piece of marketing equipment.

J. B. Belk, Albemarle Oil & Gas Co., Charlottesville, president of the asso-

ciation, said the attitude of the large company distributors toward the code had been such that he was encouraged to believe they would cooperate to make it effective.

Judge J. J. Lynch, Chattanooga, Tenn., who was counsel for the Tennessee jobbers two years ago in their anti-trust suit against the large distributors in that state, urged the Virginia men to get a better understanding among themselves as to what was the root of virtually all oil marketing ills. This root, he said, was rebating.

"Go as far back as the founding of the Standard Oil Co. in the early 70's and you'll find one thing has caused most of the trouble—rebates," he declared. "The public may benefit for a short time from extensive rebating but when the war is over and a lot of little fellows have been ruined the price goes higher than it was before. Even the big companies don't benefit. And the big fellows are not always to blame."

There is no more altruism in business than in a poker game, the judge continued, but if you break the other fellow you must do it like a gentleman —do it ethically.

Tennessee distributors, he said, had got back on their feet after the suit against the integrated companies in which suit two good results had been attained. One was a better understanding of the large companies by the small companies and the other was more respect for the small companies by the large companies.

"There will be more relief for the industry in a code of ethics than in all the litigation, than in all the legislation, than in all the support you can get from your state and federal governments," Judge Lynch assured. "But you must live up to the code. You must not only live up to it yourselves but you must see that every other distributor lives up to it. The man who violates it not only makes the oil distributing industry unprofitable but he will wreck your association."

Addressing his remarks exclusively to the small Independents, he warned, "Bear in mind you have more to lose if you violate this code than the large companies. The large companies can survive these price wars. The little fellows leave their bones on the highways."

Judge Lynch recommended a confederation of officers of state jobbers' associations of the southeastern states to assist in extending operation of the code to other states after it is adopted in Virginia.

L. H. Martin, Greensboro, N. C., said the large companies were as anxious to make money as the small ones and there should be cooperation between them to end abuses. C. S. Wallace, Moorehead City, N. C., said rebates had prevented any North Carolina jobbers from earning a profit on gasoline this year.

Gov. Byrd of Virginia who has been seeking to regulate the price of gasoline in Virginia, pleaded other engagements when invited to the Norfolk meeting but asked that a committee be appointed to talk over with him the gasoline situation. These men will wait on the government to discuss a topic that is yet unannounced from the mansion at Richmond: P. S. Ford, O. D. Ford Motor Co., Martinsville; S. D. DeShazor, Delta Oil Co., Petersburg; W. M. Eller, City Point Terminal Co., Petersburg; J. O. Krouse, Shenandoah Valley Oil Co., Berryville, and T. C. Watkins, Jr., U. S. Oil Co., South Boston.

Mr. Belk was reelected president. Other officers elected are: Mr. Ford, first vice-president; O. D. Dennis, Dominion Oil Co., Richmond, second vice-president, and Mr. Watkins, third vice-president. New directors are: B. E. Nelson, Mt. Jackson Service Stations, Mt. Jackson; E. C. Wooten, City Hall Garage Corp., Norfolk, and N. B. Whiting, Whiting Oil Co., Roanoke, Va. W. M. Eller, who has been secretary and treasurer, is expected to be reelected by the board of directors of which R. V. Van Horn, Clifton Forge, is chairman.

The next meeting of the Virginia marketers will be held in Martinsville about six months hence.

Social features of the meeting included a banquet and a cruise around the Norfolk harbor.

Coupon Exchange Wins Tourist Gallonage in Minnesota

Staff Special

MINNEAPOLIS, Oct. 21

THE coupon interchange system which has been working for about two years among members of the Minnesota Petroleum Association has been a complete success, says Paul E. Hadlick, secretary of the organization, and has been effective in turning tourists' patronage to service stations of Independent oil men.

One of the main claims for the system is that it operates without expense to the individual members. There is no overhead involved except the cost of the printing absorbed by the association which charges no fee or percentage.

The chief executive of every company wishing to take part in the interchange signs a blank form called the "coupon interchange contract". It is an agreement that the signer will accept the coupons of all the other members at their face value in payment for gasoline and oil; and that he will redeem his own used coupons at face value with cash ten days after they are submitted to him for redemption.

There is no clearing house for these coupons. They go direct from the jobber who redeems them to the one who issued them, every month. If a tourist bought an association coupon book from the Harber Oil Co., in Albert Lea and continued driving to Winnipeg, he would leave coupons at filling stations all along the line which would be sent back to the Harber Oil Co., direct, at the end of the month by the jobbers who took them in.

The association provides every jobber with "transmittal forms" to accompany each batch of coupons on its way back to the oil man who sold them. It is short and saves writing a letter, besides standardizing the system. Transmittal forms are printed in duplicate. When a jobber forwards some coupons he has accepted, he sends the original of the transmittal form and keeps the duplicate. Inasmuch as the cash is coming back in 10 days, no book entry is necessary. Lines are provided on the back to itemize coupon acceptances showing the number of each book, the amount of each purchase.

The association has offered the members a chance to standardize on a coupon book cover. Not all of them use the same type of covers on their books. The standard cover carries the name of the association as well as the name of the jobber who issues the coupons. A paragraph on the cover states that the coupons are good at any of the stations of any member of the Minnesota Petroleum Association. Incidentally, there are members of the association who do not issue any coupon books at all but they accept coupons of other members in payment for merchandise.

The coupon interchange system is influential in keeping participants on the straight and narrow path with reference to selling coupon books at discounts. If a jobber in the association sells a $10 coupon book to a hometown customer for $9, thinking he will redeem it in merchandise himself, he may be deceived. His hometown customer may go on a trip and spend his coupons elsewhere. In this case jobbers in other towns will enjoy a regular profit, but the man who sold the coupon book for $9 will have to buy it back for $10. The contract calls for redemption at face value, cash in ten days.

Some of the larger companies in Minnesota, taking part in the interchange arrangement, have published abridged lists of their fellow members printing them on a special leaf bound in with the coupon book. This also has proven a help to tourists in finding the right place to use their script, Mr. Hadlick says. At latest count 170 companies were enrolled.

Mid-Continent Refiners Study Methods To Make Better Anti-Knock Fuel

By J. C. Chatfield
N. P. N. STAFF WRITER

TULSA, Oct. 25

RESEARCH laboratories of Independent refining companies throughout the Mid-Continent field are being equipped with special apparatus for testing the anti-knock qualities of various types of gasoline.

With this special equipment refiners are making such progress in their study that some of them predict that undoped gasolines will be developed in sufficient quantity to meet the requirements of high compression motors as fast as automobile manufacturers turn to that class of engines.

Development of interest in testing the anti-knock qualities of motor fuels is expected also to lead to the establishment of a satisfactory standard test method. Thus far no method has been accepted as a standard and as a result the findings of various laboratories, even the thoroughly equipped commercial laboratories, often show wide differences on the same gasoline.

It is generally predicted by refinery technologists that some sort of motor test will be accepted.

At the four state meeting of jobbers at Kansas City on Oct. 4 Dr. M. R. Mandelbaum of the Gray Process Corp., said that "Very likely a satisfactory motor test will be devised and adopted as a standard, perhaps based on the new scale developed by Edgar, which has the advantage of using as comparison fuels, mixtures of two pure compounds."

In line with this trend of thought, Mid-Continent refiners are adding test motors to their laboratories very rapidly.

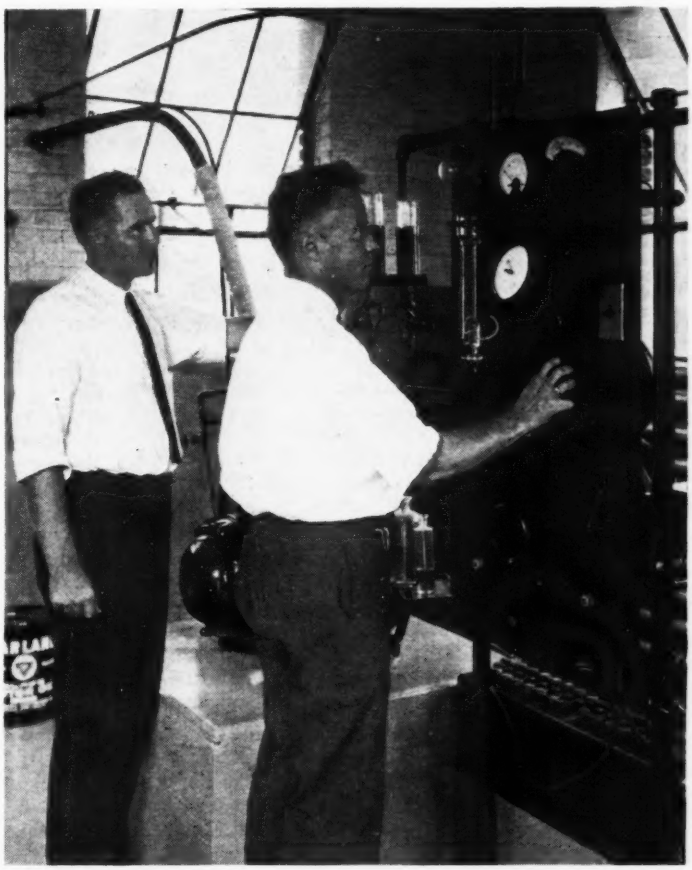
Within the past few weeks special motors have been installed by the Marland Refining Co., Skelly Oil Co., White Eagle Oil & Refining Co., Mid-Continent Petroleum Corp., Empire Oil & Refining Co., Tidal Refining Co., and the Pierce Petroleum Corp. The Pure Oil Co. has similar apparatus at its control laboratories in Chicago where samples from Oklahoma plants are tested, and the Sun Oil Co. is having its tests made at the company's laboratories in the east. A large number of other companies are having tests made at commercial laboratories.

Cost of the motors installed thus far are a modification of the Delco Farm lighting equipment. This is described by James A. Edwards, chief lubrication engineer of the Marland Refining Co., as being a "single cylinder, water cooled engine equipped with a specially designed head for the purpose of accommodating the Midgley bouncing pin apparatus for measuring the intensity of the knock.

"This consists of a cylinder, in which operates a carefully fitted piston, resistance to movement of the piston against pressure being accomplished by a carefully milled spiral spring, the spring being so designed as to give a deflection of the piston of approximately 0.005 of an inch under 200 pounds pressure. On top of the piston rides a steel rod, or the bouncing pin which, due to abnormal or violent movement of the piston, bounces off its seat, causing an electrical contact to be made on the upper-end of the apparatus.

"The electrical contact is wired to a graduated electrolytic cell in which gas is formed, depending upon the amount of contact created by the bouncing pin. In the operation of this equipment, the engine is operated at a uniform speed, namely, 1000 revolutions per minute, the water outlet temperature controlled to 180 degrees Fahr., the bouncing pin is adjusted so as to form between 0.5 and 0.75 c.c. of gas per minute when using a standardized reference fuel.

"All tests are made on the basis of comparison between the reference fuel and the fuel to be tested, to which has been added a definite amount of some anti-knock compound. In this manner it is possible to find out the anti-knock value of any particular sample of fuel, by determining the amount of anti-knock compound it is necessary to add to the fuel under test in order to match the reference fuel."



New equipment at Marland Refining Co. laboratory for testing anti-knock qualities of motor fuels. James A. Edwards, chief lubrication engineer, at instrument board, J. Stewart Hume, chemical engineer, at left

The accompanying photograph shows the installation of anti-knock testing equipment at the Marland laboratories at Ponca City. A similar installation at the plant of the Skelly Oil Co. at Eldorado, Kan., drew a great deal of attention last week when refinery technologists from all parts of the Mid-Continent visited the plant in connection with the regional technical meeting of the Western Petroleum Refiners Association.

With the aid of these test motors, refiners are discovering what crudes give the best anti-knock values.

Lawyers Battle as Trial of Fall And Sinclair Drags Along

WASHINGTON, Oct. 24

THE trial of Harry F. Sinclair and Albert B. Fall, former secretary of the interior, charged with conspiracy to defraud the United States government in the leasing of Teapot Dome naval petroleum reserve in Wyoming to Sinclair in 1922, is proceeding more slowly than did the trial of Fall and E. L. Doheny 11 months ago on a similar charge, but in connection with the Elk Hills, California, reserve lease. The Sinclair-Fall trial began a week ago and the government was still in the primary stages of building its case when court adjourned this afternoon.

Counsel for the government and the two defendants are fighting bitterly step by step. Several verbal clashes have already occurred between Owen J. Roberts, special prosecutor for the government with former U. S. Senator Atlee Pomerene of Ohio, and George P. Hoover, of Washington, first lieutenant to Martin M. Littleton of New York, chief counsel for Sinclair. William E. Leahy, Washington, and Mark Thompson, New Mexico, form the legal battery for the former cabinet officer.

Justice Frederick L. Siddons of the District of Columbia Supreme Court, in which the case is being heard, today deferred passing on the question of whether the testimony of Sinclair before the public lands committee of the senate in December, 1923, should be admitted as evidence. In that testimony Sinclair said he went to Fall's home at Three Rivers, N. M., at the end of 1921 to discuss the Teapot reservation but his counsel in outlining the defense in this trial said Sinclair's trip was to discuss certain leases and drilling permits in the Osage lands in Oklahoma.

Justice Siddons today asked for more information as to the method used to summon Sinclair before the public lands committee. Sinclair went before the committee in response to a letter in which he was asked to appear. Had he not appeared, the belief has been generally held in Washington that a formal subpena would have been issued for him. Testimony of witnesses before congressional bodies of inquiry cannot be used subsequently against them in any criminal action under a law enacted by Congress almost 70 years ago.

Justice A. A. Hoehling, who sat in the Doheny-Fall trial last year, admitted the testimony or statement Doheny gave the senate committee, but in that instance Doheny demanded to be heard and had not been summoned to appear.

Only three witnesses testified today. They were Lewis E. Eddy and Roy W. Tallman of the public land office and A. W. Ambrose, former chief petroleum technologist for the bureau of Mines. Eddy and Tallman testified to the effect that Fall had been informed by them that the placer mining claims to parts of Teapot Dome had not been prosecuted sufficiently to give them validity. Sinclair paid $1,000,000 to quiet these claims after Eddy and Tallman had reported the claims might be ignored. Eddy testified Fall thought the owners or assignees might cause trouble.

Ambrose drafted much of the leasing contract Sinclair's Mammoth Oil Co. gave the government for Teapot Dome reserve. He said he worked directly under Fall who looked after the legal phases of the contract and with Col. J. W. Zevely, Sinclair's attorney, now dead, and A. E. Watts, a vice-president of the Sinclair Consolidated Oil Corp. Part of the work of drafting the contract was done in Fall's library at the interior department and part in Col. Zevely's office in Washington, Ambrose testified, Ambrose said.

MUCH interest is being shown in the testimony to be given this week by Col. Robert W. Stewart, chairman of the board of the Standard Oil Co. of Indiana. Col. Stewart is expected to tell of the transactions of the Continental Trading Co., Ltd., of Canada which was organized to buy Mexia crude from Col. A. E. Humphreys at $1.50 a barrel and which crude was immediately purchased by the Prairie Oil & Gas Co. and Sinclair Crude Oil Purchasing Co. for $1.75 a barrel. Profits of this Canadian company were invested in Liberty bonds, $230,500 of which reached Fall's son-in-law soon after the closing of the Teapot Dome lease with Sinclair.

Following final impanelling of the jury Mr. Roberts quickly outlined what the government expected to prove. Stress was laid on the deal of the Continental Trading Co., Ltd., of Canada, which in 1922 contracted to buy more than 30,000,000 barrels of Mexia, Texas, crude oil from Col. A. E. Humphreys for $1.50 a barrel and which oil later was resold to the Prairie Oil & Gas Co. and the Sinclair Crude Oil Purchasing Co. for $1.75 a barrel. The government alleges that profits of this company, which was incorporated in Canada within a few hours of the time the sales agreement was reached with Col. Humphreys, were invested in Liberty bonds and that later $230,500 of these bonds came into the possession of Fall's son-in-law, Everhart.

Following Fall's resignation from the cabinet March 4, 1923, Sinclair is alleged by the government to have given Fall $25,000 more in Liberty bonds and later $10,000 to defray Fall's expenses to Russia as counselor for Sinclair in negotiations for Russian oil concessions. Fall is said to have given the late J. W. Zevely, attorney for Sinclair, a note for the $25,000 bonds but the note was never delivered to Sinclair. Mr. Roberts outlined other details before and after the leasing of Teapot Dome to Sinclair, indicating that the government's evidence would follow closely the evidence produced in the civil trial at Cheyenne, Wyo., in the spring of 1925 which led to the annulment of the Teapot Dome contract by the United States Supreme Court two weeks ago.

MR. LITTLETON in outlining the defense emphasized the danger of draining Teapot Dome through wells in the bordering Salt Creek field. He said the defense would show that Sinclair never was in possession of the $230,500 bonds of the Continental Trading Co. and the only thing he did in connection with that company was to guarantee with Col. Stewart in behalf of the Sinclair Crude Oil Purchasing Co. the contract with Col. Humphreys the same as O'Neil guaranteed the Continental's purchase contract in behalf of the Prairie. He said the $25,000 in bonds given Fall was an advance fee for the service expected to be performed on the trip to Russia.

The trip of Sinclair and Col. Zevely to Fall's home at Three Rivers, N. M., at the end of 1921, or about 14 weeks before Sinclair was granted the Teapot lease, was in connection with Osage lands in Oklahoma and not with Teapot Dome, Mr. Littleton said the defense would prove. He explained that Sinclair had leases in the Osage but was not permitted to drill until $1,250,000 in bonus had been paid. Wells around the Sinclair leases were endangering them, Mr. Littleton said, and Sinclair sought to get permission to begin drilling and pay the balance of the bonus later.

Col. Zevely, Mr. Littleton said, had taken this matter up with Judge E. C. Finney, first assistant secretary of the interior department, but that Judge Finney wouldn't act and Fall was in New Mexico. Fall, he said, refused to allow the Sinclair request pending an investigation of conditions in the Osage which then was in progress.

Mr. Littleton said the defense would prove that the idea for the leasing of Teapot Dome to convert

the navy's reserve oil into above ground stocks of fuel oil and tankage at strategic points along the Atlantic and Gulf seaboards, originated with Secretary of the Navy Denby and not with Fall. The idea that the leasing should be kept secret originated with Theodore Roosevelt, then assistant secretary of the navy, Mr. Littleton said the evidence would show. He also indicated that another point in the defense's case would be that a war peril existed and that Capt. John K. Robison, at that time ranking as a rear admiral, had this peril in mind when he was assisting the interior department in the administration of the naval reserves which had been transferred from the administration of the navy department in an executive order by President Harding under the Act of Congress of Feb. 25, 1920.

Mr. Littleton said that H. Foster Bain, then director of the Bureau of Mines, and A. W. Ambrose, chief petroleum technologist, had reported danger of draining of Teapot through the Salt Creek wells. Their opinion, Mr. Littleton told the jury, corroborated that of Carroll Wegemann who previously had investigated the field.

CAPT. Robison, Mr. Littleton continued, was asked what the navy was going to do about this drainage danger and replied that the navy would never undergo another experience like that in California. This California allusion was to Naval Reserve No. 2 which was checkerboarded with private leases.

Capt. Robison insisted, Mr. Littleton said, that Teapot should be leased only as a whole and then only to a lessee who was financially able to construct a pipe line to take the oil from the field to the Atlantic and Gulf coasts.

For seven weeks before the lease was let there were daily communications concerning it, Mr. Littleton said, and that Judge Finney finally approved it. During that time the maximum royalty was raised from 36 to 50 per cent, Mr. Littleton said the defense would show. He asserted Secretary Denby and Capt. Robison went over the lease line by line and when the final draft was ready Denby signed the lease knowing what it contained. Denby has admitted signing the lease but has said he didn't know what it contained.

Mr. Littleton said Sinclair bought out the claims of the Pioneer Oil Co. on Teapot Dome because he would have been confronted with four wells drilled by outsiders in the center of the reserve and the condition was made that whoever was to get the Teapot lease should turn over to the government quitclaims along with the government's copy of the leave.

After several representatives of government departments had identified various documents, and the Teapot contract, the signatures on which Fall examined closely, Judge Finney was called to the stand. A clash between Mr. Roberts and Mr. Hoover came quickly when Judge Finney was asked what had been the practice of the interior department in the leasing of mineral rights in public lands prior to the leasing of Teapot. An effort was made to block an answer but Justice Siddons overruled the defense. He said the policy was mixed, that public bidding was done in some cases but in other instances the discoverer of a mineral was granted a mining permit. He testified that in Salt Creek bidding was the rule and that for 6,400 acres there the government had received a royalty that averaged 26.875 per cent and $1,687,000 as a bonus.

Photo by Harris & Ewing

Left to right: Martin W. Littleton, chief counsel for Harry F. Sinclair; Mrs. Phoebe Sinclair, mother of H. F. Sinclair, and Mr. Sinclair leaving the courthouse at Washington

JUDGE FINNEY was on the stand all Thursday, early in the day for direct examination and later for cross-examination. He testified he wrote a letter to C. D. Applin, Minneapolis, March 9, 1922, just 30 days before the Teapot lease was given Sinclair, saying "at the present time no leases have been granted therein (in Teapot) or orders or regulations issued, offering the land for leasing." He testified he knew at the time that Teapot negotiations were under way with Sinclair but that the policy of Fall was not to make anything public.

He said the Standard of Indiana and Prairie had not applied for leases in Teapot except that Midwest Refining Co., owned by Standard of Indiana, appeared as owner of the Pioneer and Belgo claims in Teapot. H. M. Blackmer, who refused service in Europe to appear as a witness in this case, was chairman of the Midwest company.

ON cross-examination the government counsel objected to nearly every question asked by Mr. Hoover and the objections were sustained regularly. Judge Finney was asked to interpret the oil policies of the interior department in the first year of the Harding administration, particular reference being made to a policy letter which Denby wrote Fall.

Mr. Roberts objected on the ground that direct evidence was sought by cross-examination. Without a second's warning and to the astonishment of even his own counsel, Fall rose and pleaded with the court that Judge Finney be allowed to answer as the point was vital to the defense. The court ruled that the language of the letter was sufficiently plain to make an interpretation by Judge Finney unnecessary.

Taking of testimony Friday was

cut short when the government sought to introduce the testimony of Sinclair before the senate committee on public lands in 1924. The defense argued that as Sinclair was a witness he was subject to immunity when he appeared before the committee and what he said there could not be used against him. The government contended that he had only been invited to tell the senate committee, popularly known as the Walsh committee, and had not been formally subpenaed. After the jury had been excused and arguments submitted Justice Siddons took the question under advisement.

The government expected to show Sinclair told the senate inquirers the Three Rivers trip involved Teapot.

Dr. George Otis Smith, director of the Geological Survey, and K. C. Heald, former government geologist and now with the Gulf Oil Corp., were on the stand before the question of Sinclair's senate statements came up.

THEY testified to an early report of Mr. Wegemann as to a saddle between Salt Creek and Teapot and that later Wegemann submitted another report in which he placed the saddle farther back into Teapot.

Selection of a jury to hear the Sinclair-Fall case consumed a day and a half, or half a day longer than was required to get the jury which last fall acquitted Fall and E. L. Doheny of conspiracy in the leasing of the Elk Hills naval reserve.

The jury in the Sinclair-Fall case is much more mature than the Doheny jury and also contains two women. The Doheny jury was youthful and consisted of men. The Sinclair jury is composed as follows:

Mrs. Annela L. Bailey, saleswoman in a piano store.

Miss Bernice Heaton, chief long distance instructor for the telephone company.

Gardner P. Grenfell, 26 years old, electrical splicer for a power and light company.

William H. Goucher, 39 years old, manager of a tire repair shop.

Conrad J. Herzog, 56 years old, automobile sales manager.

Robert B. Flora, 38 years old, salesman for an ice company.

John P. Kern, 32 years old, bakery route supervisor.

Bradner W. Holmes, 34 years old, department store floor manager.

John J. Costinet, 61 years old, tailor.

Norman L. Glascock, 47 years old, clerk in plumbing shop.

Edward K. Kidwell, 31 years old, leather worker.

Charles Holt, 63 years old, retired bricklayer.

George Gordon Battle, New York, is "observing" the trial for H. M. Blackmer, former head of the Midwest Refining Co., who has been in Europe since the Teapot case began to boil four years ago. Monday Nathan L. Miller, former governor of New York, appeared for Blackmer and began to explain that Blackmer would not be present. Owen J. Robert, government counsel, stopped him saying he merely wished to establish Blackmer's absence. Blackmer was served with a subpena in France and by not appearing $100,000 worth of his property in the United States is subject to seizure.

Brown to Drive 3000 Miles to Test Natural Gasoline as Fuel

By W. E. Green
N. P. N. STAFF WRITER

LOS ANGELES, Oct. 22

DR. GEORGE GRANGER BROWN of University of Michigan, in charge of the research program of the Association of Natural Gasoline Manufacturers, will drive a car from Ann Arbor, Mich., to Los Angeles, using natural gasoline as fuel and will report the results of this long road test at the two-day fall meeting of the California Natural Gasoline Association, Nov. 15 and 16.

Dr. Brown will deliver a paper entitled, "Importance of Natural Gasoline as a Constituent of Motor Fuel", In addition he will answer questions put by the California gasoline men. It is expected that the long drive will furnish the answers to many questions that may arise as to the value of natural gasoline in a car under road conditions.

The banquet will be staged the evening of the second day and a number of leading oil men of California will deliver short addresses, and the heavy part of the evening will be followed by a program of fun.

At the Oct. 20 meeting, T. T. Rissinger of the Union Oil Co. of California, read a paper on "Direct Driven Reciprocating Pumps." He illustrated his paper with enlarged mechanical drawings of pumps. This paper will be published in an early issue of NATIONAL PETROLEUM NEWS.

The second paper of the evening was entitled "Geology and its Relationship and Importance to the Natural Gasoline Industry," and was read by Martin Van Couvering of Los Angeles, a consulting geologist. It is the new policy of the California association to have some paper presented at each monthly meeting on some division of the oil business other than the natural gasoline manufacturing.

Following is the tentative program for the two day meeting in November, which will be attended by a number of men from Oklahoma and Texas, in addition to members of local body:

8:00 Morning Session-Tuesday Nov. 15

8:00 a. m. 9:30 a. m. Registration.
9:30 a. m. Address of Welcome.
9:45 a. m. President's Address.
10:00 a. m. Paper—"Proposed Tentative Standard Pressure Charcoal Test for Gasoline Content of Natural Gas."
Paper to be prepared by the gas testing committee of the association and to be a summary of their recommendations. To be presented by P. S. Magrudor, General Petroleum Corp., sub-chairman.
Discussion.
11:00 a. m. Paper—"Classification of the Various Grades of Natural Gasoline Produced in California."
Paper to be prepared by the specifications committee of the association and presented by R. W. Carman, Union Oil Co., chairman.
Discussion.
11:30 a. m. Paper—"Classification of the Various Grades of Natural Gasoline Produced in California"
Paper to be prepared by the specifications committee of the association and presented by R. W. Carman, Union Oil Co., chairman.
Discussion.
11:30 a. m. Paper—"Recommendation or Standardization of Barometric Pressure in Natural Gas Measurement."
Paper to be prepared in conjunction with the metoring committee of the association and presented by Lon Laulhere. Midway Gas Co.
12:00 M.-1:30 p. m. Recess for luncheon.

Afternoon Session

1:30 p. m. Paper—"The Determination of the Vapor Tension of Volatile Liquids—Comparison of Method Proposed by C. P. Beistic of the Bureau of Explosives with Present Bureau of Explosives Standard Test for Gasolines."
Presented by C. D. Card, Union Oil Co.
Discussion.
2:30 p. m. Paper—"Analytical Gas and Gasoline Fractionation."
Presented by L. O. Warner—Barton, Manning & Warner.
Discussion.
3:15 p. m. Paper—"Safety and Fire Prevention in Gasoline Plants."
Presented by H. N. Blakeslee, field secretary National Safety Council.
Discussion.
4:00 p. m. Paper—"Production of Natural Gasoline by Conservation of Vapors."
Presented by N. G. Palmer—J. A. Campbell Co.
Discussion.

Morning Session—Wednesday, Nov. 16

9:30 a. m. Address—"Importance of Natural Gasoline as a Constituent of Motor Fuel."
Presented by Dr. C. G. Brown, Professor of Chemistry, University of Michigan. Director of Research for the "Association of Natural Gasoline Manufacturers."
Through the courtesy of the association of Natural Gasoline Manufacturers Dr. Brown will present data accumulated in connection with the last two years' research program sponsored by that association.
12:00 Noon. Adjournment for luncheon.

Afternoon Session

1:30 p. m. Continuation of Dr. Brown's Address.
Discussion.

Evening Session

7:00 p. m. Banquet and entertainment for member and visitors. A few short addresses will be made—Speakers and toastmaster to be announced later.

Proper Handling of Men Results In Lower Transportation Costs

By Roy F. Fike

THE casual observer seeing the horde of transportation units moving ceaselessly through the oil fields, fighting through the muddy roads or the deep dust in the boom fields, seldom gives thought to the magnitude of this phase of oil development. He is unlikely to realize that transportation is one of the most difficult and expensive of oil industry phases. He does not sense the battle that goes on endlessly, not only to keep the equipment moving and in good order but to keep down costs.

The fact is, the tendency today is to treat this division of company operations as a business complete in itself. A brief outline of the way the Mid-Continent Petroleum Corp. handles its transportation may illustrate some of the problems met with in the conduct of a company engaged in all branches of the industry, from producing to distributing. Such discussion is not intended as the setting up of a model plan—others may have systems that are equally good or better—but it will serve to show how one company has organized its transportation along lines that have been satisfactory from all standpoints.

There are, it seems to the writer, five points that must be considered in the successful operation of any business or department: first, there is the analysis of the job to be done; second, the plan of operation; third, organization of the work; fourth the handling or managing of the personnel; fifth, conserving and caring for the department or the business. We found, upon being asked by our company to organize a transportation department, that these five cardinal points came in the order named.

So we took our company's equipment, scattered as it was over four states, and analyzed the probability of centralizing our energies at points which would involve the least expense not only in the initial outlay but during the operation of the department. After we had made the analysis there came the planning of just how to put this analysis into form. After the plan had been pretty well outlined it was necessary to confine the routine steps in it to as small a number as possible. This came in the organization of the work Next came the handling of the personnel which means a great deal more than just the men constantly employed in the department. It involves also the relations between the heads of every major department of the company. Our transportation department differs materially from those of a number of other companies in that every automotive unit in the entire company, regardless of department, is under one head.

The last or fifth point is the keeping of the records. While our department is not a profit showing division in itself it has attained the same result in that, since its organization, a great deal of waste has been eliminated.

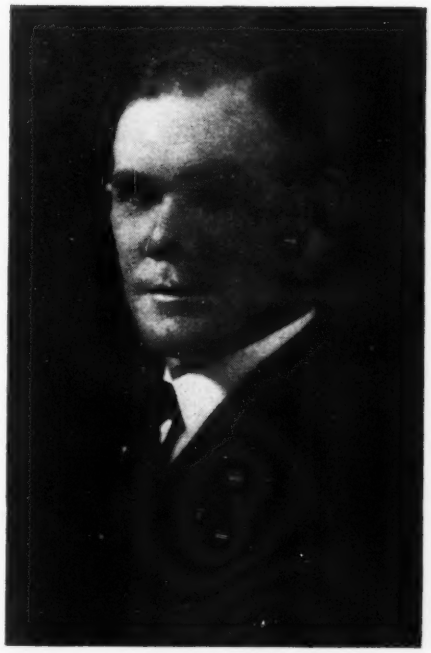
Our records are all kept at our central office. All branch and division mechanics send in their records twice each month. Under this system we get a close-up view of every car at least once in 30 days. A description of all forms used would be a lengthy task. It is sufficient to say in this regard that in forming the department we investigated as many departments of like nature as were found in this district. We then took those parts which we considered best and planted them into our new department.

The question of trucks is probably one of the biggest items of expense of any operating company. This expense is controlled to considerable extent by the drivers. When we took this department we inherited a bunch of truck drivers, several of whom it would be hard for us to give their present address, as it was necessary after checking into their plan of operation to eliminate them practically 100 per cent. We have today an interested and honest bunch of men on our trucks.

WE ATTRIBUTE this largely to constant contact with our men, trying to eliminate their problems and difficulties and trying to help every one of them. We are constantly in close touch with them through letters, bulletins and personal contact on things that will increase the life of the equipment, make their work easier and more profitable to the company, and they seem to appreciate this attention. This department controls each truck owner in the company, that is the driver is on our pay roll and is subject to our dismissal alone, and we find this is very beneficial.

On the matter of equipment each man at the head of a transportation department has ideas of his own. I don't believe that any company did or could have anticipated in the beginning, the number of units needed or the scope of his company's operations in the Seminole field development. For any man to say how many pieces of equipment would be needed in the operation of an oil field would be just as impossible as for a driller to tell just how many wells would be drilled. We have used a more or less conservative policy in our heavy duty truck situation and by so doing we avoid idle equipment.

We have found it to be very easy



ROY F. FIKE

Mr. Fike, superintendent of motor transportation department, Mid-Continent Petroleum Corp., Tulsa, has devoted close attention to oil industry transportation problems for the past year. The automotive field has engaged his attention for years. As director of the state automobile association, with headquarters in Portland, Ore., as salesman for one of the large automobile companies and as a leader in highway construction work in the Pacific northwest, he has acquired intimate knowledge of the problems of operation and maintenance of cars and trucks. Recently, he was one of the organizers of the oil fields transportation association in Tulsa which is promoting co-operative effort among oil companies on their common problems.

to get outside help to take care of our peak conditions. While it is true that you have to pay a profit for this outside help, in the main we do not figure that we lose a great deal. We try to maintain a fleet sufficient to take care of normal conditions and we find after the rush is over in any field that the normal period is of much longer duration than this extreme condition. We know of companies who have had to lay up fleets of expensive equipment for considerable time and this we are trying to avoid. So in cases when we need extra equipment to take care of boom conditions we go into the market and get bids and let contracts to different outside team and trucking concerns. Understand, this is only a temporary condition as when our development shows a sufficient need we add new equipment to take care of the situation.

PROPER equipment (speaking of trucks,) is another question that makes it possible for a number of truck companies to enjoy a nice business in the oil field. As all of us fellows have different ideas and ideals in trucks we have failed to find the perfect oil field unit as we are positive that a truck is put to every strain known to equipment in the oil field. Take for instance a heavy duty truck with a big trailer loaded with pipe, the load boomed and chained to the truck and trailer, going into chug holes one after the other, and in the length of the truck and trailer each and every wheel being in a different depth of mud or dust it is easy to understand that conditions exist, that mere proving grounds that any manufacturer provides cannot compare with. Therefore I make the broad statement that we can take any proving grounds of any manufacturer of trucks or automotive equipment and show how insufficient those grounds are to develop the weakness of their equipment. We find however in the best of equipment a motor weakness, in another a transmission weakness, in another a rear end weakness.

Some of these however would be undeveloped under ordinary conditions and we find the most damaging and most expensive cause of our trouble is the high center and it seems to us that manufacturers in general would give quite some thought to the bad road conditions before they lower their clearance. There seems to be a general trend instead of increasing their clearance to lower it. Of course there is a reason for this as perhaps 90 per cent of their output is being operated on paved or good roads. If we could have this clearance a great percentage of our trouble would be eliminated. We know of no more important service than this that they could render to the motor transport departments in the oil field in the cutting down of our mechanical expense.

In our division points which are located at all active developments we maintain a man to take care of the ordinary mechanical work on our cars and trucks, however these division shops are not equipped to handle major overhaul jobs. They do carry a stock of the more or less active parts, we mean by this the parts that it is necessary to replace most often. The number of men at these points is governed by the number of pieces of equipment in their territory. We consider 20 pieces in the active field sufficient for a first class mechanic to take care of. We of course have a thoroughly equipped central garage which takes care of all overhaul jobs. At this point we have a number of mechanics, helpers and general handy men as well as a complete stock of parts. All of our division mechanics report to the general foreman and he advises them in connection with their work at their point. We have found that by taking care of all our mechanical troubles we have effected quite a considerable saving and we are thoroughly sold on the idea of operating our own shop.

In the cutting down of engine trouble, carburetor trouble, transmission trouble, tire trouble and other expense items we are going to come back to the man behind the wheel. If he will use the information he has and the facts accorded him by our organization this will be reduced to a minimum. However, if he is a driver who figures out a way to get two or three hours off by pleading ignition or carburetor trouble we soon catch up with him and eliminate him.

IF HE is a driver who is trying to make a record with his equipment you will find a minimum of his trouble is reported by him. As we operate our own telephone system in all our fields of operation it is a very simple matter for every man who is having trouble with his equipment to get in touch with his divison mechanic or if he is away from his own division with the one nearest him and the mechanic will come to him immediately. This is going to the mountain rather than having the mountain come to you.

So we say in conclusion, that in our judgment we are operating our department as economically as we now know, further that we are moving our material at as low per ton per mile cost as any company we know of, also that we are operating our equipment at as low a cost per mile as any other company in the field. We are not making these statements in a boastful way but simply because from a comparison with a number of other companies we are justified.

The Rincon—Panhandle's Desert Song

Going "up to the corner" at Tucson, Ariz. doubtless usually means going to this new station of the Panhandle Oil Co. on Park Ave. at Tucson. The station is called "The Rincon", which, for the benefit of those who are not up on their Spanish, means "the corner", W. E. Campbell, head of the company in Arizona, says. "Rincon" is also the name of a chain of mountains near Tucson.

Refiners to Appeal to Railroads From Rate Decision

Staff Special
TULSA, Oct. 22

MID-CONTINENT refiners will appeal to the railroads for relief from the new maximum oil rates allowed by the Interstate Commerce Commission in its order of Oct. 4. Present sentiment among refiners is that another appeal to the commission would be useless in view of the tenacity which the body has shown in its idea that rates have been too low in the past. The new rate decision sets up rates which the commission has found to be reasonable maximum rates. In other words the railroads are prevented from putting in any rates higher than those prescribed. The carriers may leave the Oklahoma and central Kansas rates on their present level if they feel that course to be best, but if this course is followed the railroads must reduce their rates from southeastern Kansas in order to give refiners in that group a set of rates 2 cents per hundred pounds lower than the Group 3 rates.

Southwestern railroads serving Oklahoma and Kansas refiners have made a rather careful study of the oil business because of the fact that a large part of their revenue comes from oil. Officials of these lines are more or less conversant with the economics of the business, realize how keenly competitive the refining branch has become, and may be expected to lend a sympathetic ear to the plea of the shippers. As a matter of fact in the recent reopening of the case a number of the important Southwestern lines sided with the Oklahoma refiners in their arguments before the commission.

But the southwestern carriers do not have full authority to refrain from advancing the Oklahoma rates to the commission's maximum. The decision affects rates to points beyond the territory served by the southwestern lines. This makes it necessary for the western trunk lines to agree also.

Undoubtedly the most difficult part of the task before the refiners will be to show the northern railroads that it will be to their benefit not to take the increases granted. The western trunk lines are the ones which have been pushing vigorously for increases in farm product rates as well as for a flat advance in all rates. They have been eager for more revenue tonnage they originate on their own lines and may be expected to be just as eager for more money for delivering the southwestern oil products.

In their request to the railroads for no advances in Oklahoma and central Kansas rates which means also a request for a cut in southeastern Kansas rates, the refiners will have one strong talking point. That is that the southeastern Kansas group is quite small in comparison to the remainder of the territory affected and that much of the refined products from these plants does not move into the destination territory affected.

The plants in this group are operated by the Standard Oil Co. of Kansas, Sinclair Refining Co., National Refining Co., Peerless Oil & Refining Co. and the Wilhoit Refining Co. The Standard plant is the most important in the group with a capacity of 12,000 barrels per day. Most of the light oils produced at this plant are marketed in Kansas and Nebraska which are not affected by the new rate decision. The Wilhoit Refining Co. markets most of its products locally also and the Sinclair Refining Co. has plants at Kansas City and Chicago which are more logical shipping points for products to be sold in the area affected by the increased rates. The National also has an eastern plant.

The capacity of operating refineries in the new Group 2 is about 27,500 barrels per day. This is less than 10 per cent of the total operating refining capacity in the two states. When the capacity of plants in north Texas and north Louisiana and Arkansas is considered the small group in southeastern Kansas becomes even smaller by comparison.

Traffic managers of a large group of Oklahoma and Kansas refining companies met on Oct. 18 to discuss the situation. They agreed generally that an appeal to the carriers would be the best course of action. On Oct. 24 executives of interested companies will meet in Tulsa to discuss the subject further.

Committee Named

Telegraph Bulletin

TULSA, Oct. 25.—Executives of Oklahoma and Kansas refining companies, who met here today to discuss the recent freight decision of the Interstate Commerce Commission, agreed the refining industry here will suffer severely if the new maximum rates are put in effect by the carriers. It was the general opinion that the refiners would have to construct pipe lines to lower rate areas or consuming centers or, otherwise, the life of the refinery investments in the two states would be materially reduced.

It was decided to present the situation to the railroads as quickly and clearly as possible. A committee was appointed to approach the railroads which will consist of Jacob France, president of the Mid-Continent Petroleum Corp.; W. G. Skelly, president of the Skelly Oil Co.; L. L. Marcell, president of the White Eagle Oil Refining Co.; E. W. Marland, president of the Marland Refining Co.; E. B. Reeser, president of the Barnsdall Refineries, Inc., and P. M. Miskell, general manager of the Empire Oil and Refining Co.

A. O. M. A. Will Spend Evening On World Airplane Tour

Staff Special
CHICAGO, Oct. 22

PERSONAL experiences of an around the world flier will be related at the banquet of the American Oil Men of America convention by Ed F. Schlee, Wayco Oil Corp., Detroit. "Pride of Detroit," the monoplane which took the world flyers from Detroit to Tokio, where the flight was abandoned, will bring Mr. Schlee to the convention at West Baden Springs Hotel, West Baden, Ind., on Nov. 2, 3 and 4.

Thursday, Nov. 3, is the day of the heavy program. In the forenoon Dr. G. G. Brown and Dr. Gustav Egloff of Universal Oil Products Co., Chicago, will speak on "The Gasoline of Tomorrow." H. L. Fogleman, Sheldon School of Salesmanship, Chicago, in the afternoon will speak on "Salesmanship vs. Price Cutting."

"Factors Affecting Lubrication," by H. C. Mougey, chief chemist of General Motors Research laboratory, and "Advertising," by L. G. Meads of the Blackman Co., are on Friday's program.

J. A. Gilmore, secretary of the A. O. M. A., said an exceptionally good program has been arranged for the ladies, that something interesting has been planned for every minute and that the oil men should bring their wives with them.

Much publicity was unleashed during the second half of the month, to stimulate interest in the convention. Association headquarters in Chicago mailed gold plate card calendars for November showing the convention

dates in black letters; National Oil Equipment & Exhibitors Association mailed some 5,000 letters; and A. O. M. A. directors are mailing dignified engraved invitations to their friends; and the West Baden Springs Hotel has issued literature.

The circumference of the hotel foyer will be lined with exhibition booths. Two nationally known companies have joined to show their wares in full-sized filling stations. Dr. G. G. Brown, professor of chemical engineering at the University of Michigan, will test gasoline samples brought by jobbers at the Association of Natural Gasoline Manufacturers' booth. Three gallons is sufficient for a test, Dr. Brown said, but five gallons would be better. Dr. Brown will also show what effect natural gasoline will have on the sample.

Indian Refining Co., Lawrenceville, Ill., has arranged a sight seeing trip through its refinery for jobbers desiring to remain over Saturday. Detail plans will be announced at the convention.

J. C. DENTON

Denton New President of Okla.-Kans. Division of Producers

TULSA, Oct. 22

ANNUALLY, the Kansas-Oklahoma division of the Mid-Continent Oil & Gas Association elects a president, several vice-presidents, secretary and treasurer. It is an organization devoted to the handling of problems common to all oil men, hence there is seldom spirited contest at election time.

This year was no exception. J. C. Denton, vice-president and chief-counsel of the Mid-Continent Petroleum Corp., prominent worker in association affairs, was in California, but the executive committeemen felt certain that he would accept so they proceeded to elect him president.

They elected also C. C. Herndon, vice-president of the Skelly Oil Co., as first vice-president of the division, succeeding Lee Scott, formerly of the White Eagle Oil & Refining Co. A. M. Landon, of Independence, Kans., was re-elected a vice-president to represent Kansas in the division; Wirt Franklin, of Ardmore, succeeded himself as vice-president for southern Oklahoma and John H. Kane, vice-president of the Phillips Petroleum Co., was again elected vice-president to represent northern Oklahoma.

Harry H. Smith was re-elected secretary, treasurer and general counsel.

A vote of thanks was given Henry McGraw, retiring president of the division. Mr. McGraw declined to be a candidate to succeed himself, saying that he could not give the association the time its work should properly have.

Secretary Smith reviewed the association work for the past year in his report. The division has carried on successfully campaigns to defeat proposed increases in the production tax in Oklahoma. Three principal attempts were made. Now a fourth is incubating. This is an initiated petition to bring to public vote an increase gross production tax from 3 to 5 per cent. Campbell Russell, inveterate wielder of the initiative and referendum, is backing this move. He has filed 51,000 names with the secretary of state, which is about 20,000 more than he needs. Protest has been filed that many of the names are not bona fide signatures, and hearing asked by E. P. Jones, president of the Okmulgee District Oil & Gas Association; J. D. Conover, of the Tri-State Lead and Zinc Association, which minerals would also suffer an increase in taxation and W. R. Ramsey, independent producer.

Shipping Board Fuel Oil Contracts Let

(By Telegraph)

WASHINGTON, Oct. 25.—Contracts for supplying fuel oil in 1928 to shipping board steamers operating from Atlantic and Gulf ports were made today as follows:

Gulf Refining Co. for delivery at New York for bunkering ships, estimated maximum requirements 315,000 barrels per month, at a maximum price of $1.63 at terminals and $1.68½ by barge for bunkering at Philadelphia estimated maximum requirements 66,000 barrels per month, at a maximum price of $1.53 at terminals and $1.58½ by barge at Galveston, Texas, estimated maximum, 262,500 barrels per month at maximum price of $1.33 terminal and $1.38½ by barge at Port Arthur, estimated maximum 40,000 barrels per month at a maximum price of $1.28 at terminals and $1.33½ by barge.

Under the terms of this contract the New York price will be posted market price at New York; the Philadelphia price will be 10 per cent below the posted price at New York; the Galveston price will be 30 per cent below the New York price, and the Port Arthur price will be 35 per cent below the New York price.

Standard Oil Co. of New Jersey for bunkering at New Orleans, estimated maximum requirements of 175,000 barrels per month at a maximum price of $1.30 at terminals and $1.35 by barge; and for delivery to shipping board tankers at Bay Town and Baton Rouge, an estimated total of 1,300,000 barre's for the year at a flat rate of $1.15 per barrel.

The Texas Co. for bunkering at Charleston, estimated total requirements of 25,000 barrels per month at a maximum price of $1.55, and for bunkering at Jacksonville an estimated total requirement of 15,000 barrels per month, at a maximum price of $1.55 per barrel. These maximum prices shall be the posted market price on day of delivery, subject to maximum quoted. Same applies to the contract of the Standard Oil Co. of New Jersey.

Hadlick Calls Meeting Of Executives Club

CHICAGO, Oct. 21.—The Executives club, composed of presidents and secretaries of state oil jobbers' associations, will hold its annual convention at the Gray room, Congress hotel, Chicago, Nov. 11 and 12.

H. H. Ragle, American Oil Corp., Jackson, Mich., is president of the club and president of the Michigan Independent Oil Men's Association. The club's secretary is Paul E. Hadlick, secretary of the Minnesota Petroleum Association.

"All presidents and secretaries of state associations throughout the United States are invited to attend," Mr. Hadlick says. "The meetings will be open discussions of oil association activities and matters pertaining to the oil jobbers whom these state associations mean to serve."

Pure Oil Asks I.C.C. to Dismiss Complaints on Rates into East

WASHINGTON, Oct. 24

APPEALING for a railroad freight rate adjustment that will allow the Appalachian field to live, the Pure Oil Co. has asked the Interstate Commerce Commission to dismiss the complaints of the Mid-Continent Refiners Traffic Association and of the Transcontinental Oil Co. as the first step in such preservation. That is part of the first of many volleys that will be fired by conflicting interests involved in the rate body's general investigation of rates on petroleum and its products that has been going on for nearly two years.

Argument in behalf of that step has been submitted to the rate commission by James M. Beck, former solicitor general of the United States, who has come into public notice within the week because he is slated apparently to come to the senate, from Pennsylvania, to fill the seat made vacant by the contested election of W. S. Vare. Arlington C. Harvey, the Pure Oil Co.'s general counsel, and Henry Hauseman, its traffic manager, also participated in the preparation of the argument.

Among the reasons assigned for the dismissal is that sales of refined oil in central territory—that is, north of the Ohio and east of the Illinois-Indiana line, particularly in Ohio—are based on the Tulsa price. The base price for the major portion of the gasoline sales in tank cars in Ohio is the Group 3 quoted price, which is published every morning in PLATT'S OILGRAM and in other oil papers and is widely disseminated by telegram and telephone to various companies and other purchasers, said Pure Oil lawyers and traffic manager.

The Mid-Continent Traffic association asked the rate body to substitute, for the prevailing rates, a new set which would effect reductions of one-half to more than two cents a gallon, for the transportation of their products to Indiana and to all points east; a rate that would approximate the cost of transportation of the crude by pipe line to the central and eastern refineries, plus short haul railroad rates to final destinations, Pure Oil Co. asserts. The traffic association claims that the Mid-Continent refiners, by means of lower freight rates, should be able to reach central and eastern consuming centers on a marketing equality with refiners in these older and more settled portions of the country, which have been for many years and are now, in a position to avail themselves of the transportation of crude oil by pipe line, said Pure Oil.

Such propositions, Pure Oil contends, are violative of all the canons of rate making and tend to deprive the Appalachian field of the advantage of its location near the centers of heavy consumption, force the closing of thousands of wells in the older field and generally adding to the advantages the Mid-Continent refiners have had notwithstanding their great distance from the heavy consuming territory.

Pure Oil attorneys point out that while the highest level of general freight rates in the country is in the southwest (which includes the Mid-Continent) the oil rates there are the lowest. The lowest general level of freight rates they continue, is in the central territory. The highest level of petroleum rates is in the south while the oil rates in central territory are on a medium level.

THE Pure attorneys are so convinced that the Mid-Continent refiners have advantages not warranted by their location that they have also asked the rate body to reverse or at least modify its decision in the Indiana State Chamber of Commerce case in which it ordered an adjustment of rates to Indiana which had the effect of moving the "hump" in oil rates which theretofore had existed at the Illinois-Indiana line to the Indiana-Ohio line. They said that that decision had caused conditions of discrimination and undue prejudice greater than those which the findings were intended to correct.

Further, the Pure company asks that rates from the Mid-Continent field be made proportional to the Mississippi river, both north and south of the Ohio river, plus the local rates within central and southern territory; that rates from New Orleans to central and eastern territory be no lower than from Group 3; that rates from Cabin Creek Junction, W. Va., Heath, O., and from Cincinnati to short-haul destinations be condemned as unreasonable and unduly prejudicial; and rates from Mobile, Ala., Pensacola, Fla., and south Atlantic ports, to the southeast be established on a mileage scale because they are too high now in comparison with rates from New Orleans and Baton Rouge.

What it asks, in substance, is that either the rates in central territory be put down, or that the rates from the other territories be put up so as to give the older field an adjustment of rates that will enable it to continue production and refining.

Southwest Gas Men To Meet Oct. 31

HOUSTON, Oct. 20.—The southwest division of the Natural Gas Association of America will hold its fall meeting in Houston, beginning Oct. 31 and lasting three days. Papers and discussions will deal with various subjects covering the wide scope of the industry.

The Houston meeting will be the first since consolidation of the Natural Gas Association of America with the American Gas Association. Major Alexander Forward, managing director of the American Gas Association, and N. C. McGowan of Shreveport, chairman of the natural gas division, will discuss association work with regard to the industry.

C. B. McKinney, president of the Houston Pipeline Co., and Frank Kirk, also of that company, are going ahead with entertainment plans. Mr. McKinney is chairman of the entertainment committee.

George McQuaid of Dallas, secretary of the southwest division, announces that the Houston meeting dates were selected to avoid conflict with any other convention.

Index to Coming Meetings

Natural Gas and Petroleum Association of Canada, Prince Edward Hotel, Windsor, Ont., Oct. 28.

American Oil Men's Association, West Baden Springs Hotel, West Baden, Ind., Nov. 2, 3, 4.

Indiana Independent Petroleum Marketers Association, West Baden Springs Hotel, West Baden, Ind., Nov. 3.

State Executive Club, Congress Hotel, Chicago, Ill., Nov. 11, 12.

California Natural Gasoline Association, Biltmore Hotel, Los Angeles, Nov. 15 and 16.

American Petroleum Institute, Hotel Stevens, Chicago, Dec. 6, 7, 8.

Ohio Petroleum Marketers Association Spring Convention and Exhibit Exposition, Neil House, Columbus, O., Feb. 22, 23, 24.

American Oil Burner Association, Hotel Stevens, Chicago, April 3, 4, 5, 1928.

Gasoline Consumption 8.48% Greater In First 8 Months 1927

Staff Special
CLEVELAND, Oct. 24

GASOLINE consumption in 34 states and the District of Columbia increased 8.48 per cent during the first eight months of 1927 as compared with the similar period in 1926, and in August this year increased 8.30 per cent over August 1926. These figures are taken from reports of wholesalers and dealers under provision of the gasoline tax laws or inspection laws by the American Petroleum Institute.

In August this year 667,828,000 gallons were consumed as against 660,461,000 gallons for July 1927, a gain of 7,367,000 gallons or 1.1 per cent daily increase. The following states had larger July consumption than August, Georgia 4,103,000 gallons, Kansas 3,818,000 gallons, Oklahoma 753,000 gallons, Utah 452,000 gallons, Nevada 267,000 gallons, Wyoming 170,000 gallons, District of Columbia 164,000 gallons, and Colorado 12,000 gallons.

Total consumption for the first eight months of the current year was 4,150,106,000 gallons compared with 3.825,546,000 gallons in the first eight months of 1926, a gain of 324,560,000 gallons.

Four states, for the first eight month period, showed a loss of gallonage, consumption falling off in Arkansas 5.07 per cent, in Florida 12.93 per cent, North Carolina 7.05 per cent, and New Hampshire 14.05 per cent. New Mexico had the biggest percentage gain with 24.18 or 3,800,000 gallons and Maine was second with 22.02 per cent or 8,468,000 gallons. Ohio remained in first place as the largest gasoline consumer among states reporting using 495,938,000 gallons during this period or a gain of 11.21 per cent or 49,971,000 gallons. Michigan was the next highest state, showing a gain of 15.03 per cent or 52,588,000 gallons. Texas was third largest consuming state with 14.52 per cent gain or 48,204,000 gallons.

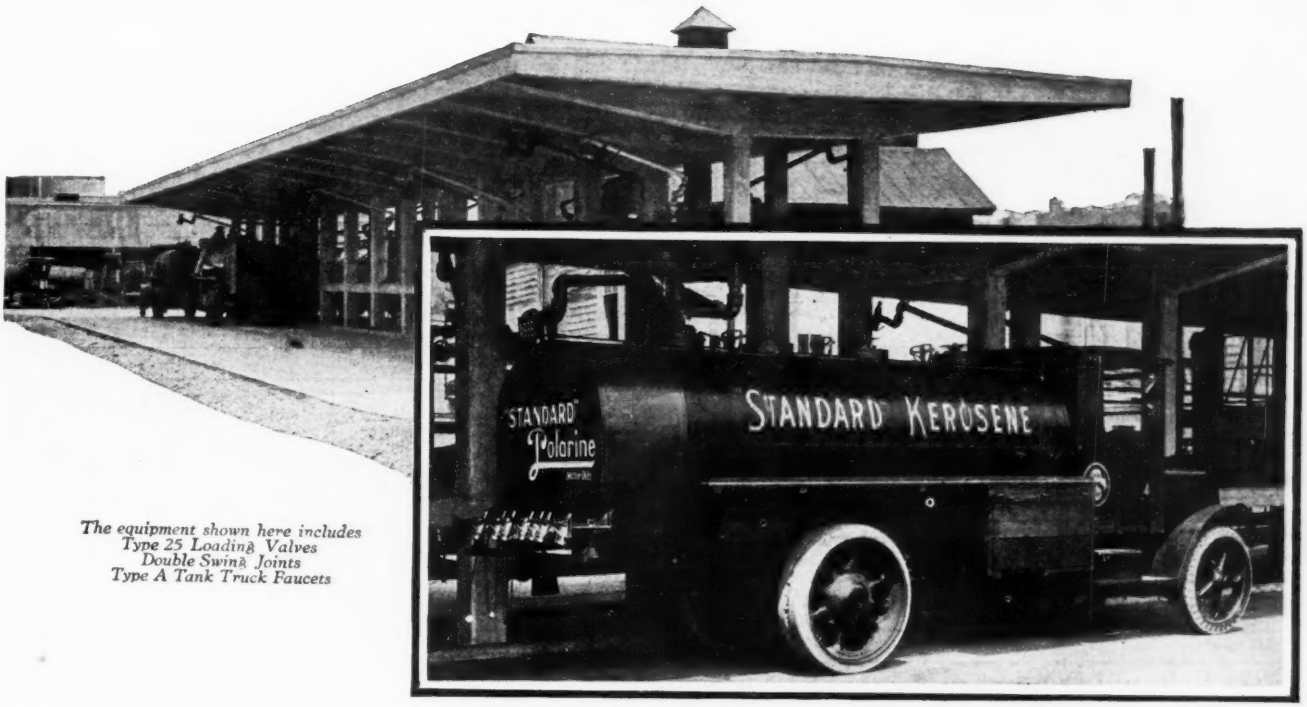
Only two states, Florida and Georgia, were behind their 1926 August gallonage, this by 10.87 and 23.10 per cent respectively. South Dakota showed the greatest gain last month over August 1926 with 35.53 per cent or 3,195.000 gallons and Arizona was second with 27.18 per cent or 754,000 gallons. Of the three largest consuming states Michigan had the greatest gain of 23.37 per cent, or 13,712,000 gallons; Ohio was second with 10.60 per cent or 7,366,000 gallons gain and Texas third with 11.32 per cent gain or 5,684,000 gallons gain.

Following is the detailed report:

Gasoline Consumption by States, August, 1927

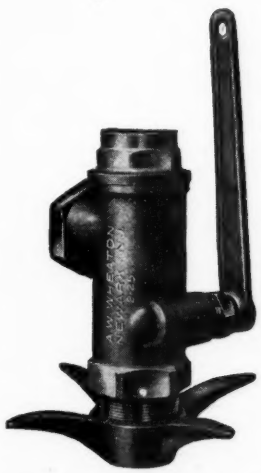
	July, 1927 Gallons	Aug., 1927 Gallons	Aug., 1926 Gallons	% Change Aug., 1927 over Aug., 1926	8 Months Aug., 1927 Gallons	Ending with Aug., 1926 Gallons	% Change
Alabama	13,550,000	14,104,000	11,960,000	+17.93	95,451,000	83,023,000	+14.97
Arizona	3,230,000	3,528,000	2,774,000	+27.18	24,044,000	20,832,000	+15.42
Arkansas	(a) 9,020,000	9,596,000	8,973,000	+ 6.94	62,398,000	65,734,000	— 5.07
Colorado	13,912,000	13,906,000	12,612,000	+10.26	85,750,000	73,418,000	+16.80
Delaware	2,284,000	2,593,000	2,144,000	+20.94	15,656,000	12,872,000	+21.63
District of Columbia	5,258,000	5,094,000	4,571,000	+11.44	37,921,000	33,384,000	+13.59
Florida	17,428,000	18,871,000	21,173,000	—10.87	170,560,000	195,884,000	—12.93
Georgia	16,507,000	12,404,000	16,130,000	—23.10	117,702,000	109,457,000	+ 7.53
Idaho	4,928,000	5,379,000	4,765,000	+12.89	27,109,000	25,829,000	+ 4.96
Indiana	32,995,000	35,094,000	31,600,000	+11.06	214,208,000	190,297,000	+12.57
Iowa	(b) 38,003,000	29,597,000	27,439,000	+ 7.86	189,222,000	166,896,000	+13.38
Kansas	31,847,000	28,029,000	25,986,000	+ 7.86	178,518,000	163,608,000	+ 9.11
Kentucky	12,278,000	12,852,000	10,784,000	+19.18	74,039,000	68,237,000	+ 8.50
Louisiana	12,847,000	13,553,000	12,150,000	+11.55	96,621,000	87,130,000	+10.89
Maine	10,325,000	11,244,000	9,843,000	+14.23	46,932,000	38,464,000	+22.02
Michigan	65,157,000	72,397,000	58,685,000	+23.37	402,456,000	349,868,000	+15.03
Minnesota	31,909,000	34,757,000	29,521,000	+17.74	190,937,000	176,936,000	+ 7.91
Nebraska	17,831,000	18,519,000	16,154,000	+14.64	110,224,000	102,303,000	+ 7.74
Nevada	1,579,000	1,312,000	1,191,000	+10.16	8,319,000	7,011,000	+18.66
New Hampshire	5,728,000	6,329,000	5,791,000	+ 9.29	24,638,000	28,667,000	—14.05
New Mexico	2,861,000	3,098,000	2,571,000	+20.50	19,514,000	15,714,000	+24.18
North Carolina	18,645,000	18,916,000	17,217,000	+ 9.87	126,212,000	135,790,000	— 7.05
North Dakota	8,507,000	12,445,000	9,743,000	+27.73	54,061,000	50,988,000	+ 6.03
Ohio	75,686,000	76,856,000	69,490,000	+10.60	495,938,000	345,967,000	+11.21
Oklahoma	24,435,000	23,682,000	22,218,000	+ 6.59	163,840,000	136,789,000	+19.78
Oregon	14,505,000	14,946,000	12,763,000	+17.10	86,143,000	78,190,000	+10.17
Rhode Island	6,509,000	6,983,000	5,919,000	+17.98	40,935,000	36,250,000	+12.92
South Carolina	9,114,000	9,633,000	8,322,000	+15.75	64,006,000	58,630,000	+ 9.17
South Dakota	7,998,000	11,517,000	8,498,000	+35.53	56,974,000	51,004,000	+11.70
Texas	53,255,000	56,342,000	50,658,000	+11.22	380,151,000	331,947,000	+14.52
Utah	4,699,000	4,238,000	3,993,000	+ 6.14	26,903,000	23,585,000	+14.07
Virginia	16,099,000	17,043,000	14,257,000	+19.54	106,315,000	91,712,000	+15.92
Washington	21,119,000	22,140,000	19,032,000	+16.33	134,671,000	122,494,000	+ 9.94
Wisconsin	36,037,000	37,614,000	31,970,000	+17.65	204,570,000	175,690,000	+16.44
Wyoming	3,387,000	3,217,000	2,896,000	+11.08	17,208,000	15,627,000	+10.12
Total	660,461,000	667,828,000	616,651,000	+ 8.30	4,150,106,000	3,825,546,000	+ 8.48
Daily Average	21,305,000	21,543,000	19,892,000	+ 8.30	17,079,000	15,743,000	+ 8.48
Increase over previous year:							
Amount	.....	51,177,000	.....	.....	324,560,000	.....	
Percentage	.....	8.3%	.....	.....	8.5%	.....	
New Jersey	33,305,000	38,362,000	.....	.....	.....	.....	

(a) Revised.
(b) Beginning July 4, 1927, gasoline tax in Iowa became collectable on an importation basis and not on a sales basis as before.



The equipment shown here includes
Type 25 Loading Valves
Double Swing Joints
Type A Tank Truck Faucets

This Slow-closing, Self-closing Valve *Prevents Leaks and Overflows*



Type 25 Loading Valve

This is a right-angle valve, especially adapted for installation at the effluent end of the line. Sizes: 2, 2½ and 3-inch. Type 26 is similar to Type 25 except that it is a straight valve for mid-line location.

WHEN a loading valve closes with a jar, it may cause *leaks.* And, if a loading valve is carelessly left open, not only does overflow result but serious damage may follow.

The Wheaton Type 25 Loading Valve *prevents* leaks and overflows; it is *slow-closing* and *self-closing.* It may not prevent carelessness, but it does protect you *against carelessness.*

Type 25 is *counterbalanced*—which makes the closing action of the valve *slow, smooth* and *easy.* This prevents leaks which would result if the valve shut with a jar. Moreover, with Type 25, the valve has to be *held* open—the instant the handle is released the valve *closes tight.*

Type 25 lives up to the Wheaton reputation of *unmatched quality.* It is made of a special-analysis brass alloy—tempered and toughened to assure long life despite hard wear. It is equipped with a sturdy brass alloy spider which prevents it from slipping into the tank and catching; this removes the danger of jerking joints loose should the truck move.

We will gladly send you a sample of Type 25 Loading Valve. If it does not prove satisfactory you may return it for full credit or refund.

Write for the illustrated Wheaton Catalog containing full information about all the Wheaton Products.

A. W. WHEATON BRASS WORKS, NEWARK, N. J.

Wheaton

FAUCETS · VALVES · JOINTS · COUPLINGS · FILLERS · NOZZLES · FITTINGS

Compilation Of Mid-Continent Refinery Operations

All Rights Reserved to National Petroleum Publishing Co.

National Petroleum News

Mid-Continent Refinery Operations Week Ended October 21 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	North La.-Ark.	Total Week Ended Oct. 21	Total Week Ended Sept. 23
Plants Reporting	23	46	41	14	124	124
Crude Capacity (bbls.)	106,200	165,900	144,300	53,700	470,100	470,100
Cracking Capacity	29,000	45,800	15,750	20,200	110,750	110,750
Da. Av. Crude Runs	54,907 — 1.5	111,498 + 6.0	65,253 + 9.0	38,265 — 10.5	269,923 + 2.4	283,265
Da. Av. Other Oils	4,994 + 61.8	1,364 — 24.3	4,655 — 40.7	2,310 + 68.7	13,323 — 5.6	15,942
GASOLINE—Gallons						
Stocks, Oct. 15	6,429,000	32,842,000	18,278,000	2,895,000	60,444,000	55,485,000
Prod. 10-15 to 10-22	8,069,000 + 1.5	18,101,000 + 8.4	7,598,000 + 4.5	3,649,000 + 4.4	37,417,000 + 5.6	39,660,000
Ship. 10-15 to 10-22	8,240,000 + 2.0	16,625,000 + 25.5	7,612,000 + 18.7	3,523,000 + 5.0	36,000,000 + 15.7	40,367,000
Stocks, Oct. 22	6,258,000 — 2.7	34,318,000 + 4.5	18,264,000 — 0.1	3,021,000 + 4.4	61,861,000 + 2.3	54,778,000
Ratio Sales to Prod.	102.1%	91.8%	100.2%	96.5%	96.2%	110.8%
KEROSENE—Gallons						
Stocks, Oct. 15	3,522,000	5,765,000	1,681,000	512,000	11,480,000	9,135,000
Prod. 10-15 to 10-22	1,400,000 — 3.4	3,241,000 — 1.0	1,320,000 — 14.5	453,000 — 2.8	6,414,000 — 4.7	5,924,000
Ship. 10-15 to 10-22	1,633,000 + 29.4	2,920,000 + 9.6	1,699,000 + 58.8	313,000 — 43.6	6,565,000 + 18.2	5,167,000
Stocks, Oct. 22	3,289,000 — 6.6	6,086,000 + 5.6	1,302,000 — 22.5	652,000 + 27.3	11,329,000 — 1.3	9,892,000
Ratio Sales to Prod.	116.6%	90.1%	128.7%	69.1%	102.4%	87.2%
STOVE DISTILLATE—Gallons						
Stocks, Oct. 15	4,542,000	6,863,000	1,971,000	26,000	13,402,000	14,337,000
Prod. 10-15 to 10-22	474,000 — 31.6	578,000 — 17.9	311,000 + 16.5	62,000 + 12.7	1,425,000 — 17.1	1,660,000
Ship. 10-15 to 10-22	394,000 — 41.6	155,000 — 89.2	204,000 — 4.2	79,000 + 61.2	832,000 — 64.9	1,610,000
Stocks, Oct. 22	4,622,000 + 1.8	7,286,000 + 6.2	2,078,000 + 5.4	9,000 — 65.9	13,995,000 + 4.4	14,387,000
Ratio Sales to Prod.	83.1%	26.8%	65.6%	127.4%	58.4%	97.0%
GAS OIL—Gallons						
Stocks, Oct. 15	8,011,000	41,015,000	17,037,000	8,252,000	74,315,000	76,110,000
Prod. 10-15 to 10-22	1,337,000 — 28.0	1,362,000 + 8.3	1,164,000 — 7.9	1,914,000 — 12.0	5,777,000 — 11.9	6,536,000
Ship. 10-15 to 10-22	875,000 — 49.2	2,214,000 +212.3	734,000 — 4.6	1,431,000 — 47.6	5,254,000 — 11.9	6,578,000
Stocks, Oct. 22	8,473,000 + 5.8	40,163,000 — 2.1	17,467,000 + 2.5	8,735,000 + 5.9	74,838,000 + 0.7	76,068,000
Ratio Sales to Prod.	65.4%	162.6%	63.1%	74.8%	90.9%	100.6%
FUEL OIL—Gallons						
Stocks, Oct. 15	15,089,000	45,440,000	33,353,000	10,741,000	104,623,000	100,086,000
Prod. 10-15 to 10-22	5,725,000 + 18.5	7,868,000 + 6.7	8,448,000 + 9.8	5,515,000 — 8.9	27,556,000 + 6.2	29,363,000
Ship. 10-15 to 10-22	5,611,000 + 9.0	6,284,000 — 24.2	8,596,000 + 10.6	5,914,000 — 10.2	26,405,000 — 5.0	25,515,000
Stocks, Oct. 22	15,203,000 + 0.8	47,024,000 + 3.5	33,205,000 — 0.4	10,342,000 — 3.7	105,774,000 + 1.1	103,934,000
Ratio Sales to Prod.	98.0%	79.9%	101.8%	107.2%	95.8%	86.9%

Gasoline Produced by Various Methods, Week Ended October 21

	Kansas	% of Total	Oklahoma	% of Total	Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	5,440,000	67.4	13,294,000	73.4	6,411,000	84.4	1,443,000	39.6	26,588,000	71.0
Cracked	2,137,000	26.5	3,393,000	18.8	845,000	11.1	1,669,000	45.7	8,044,000	71.5
Natural	492,000	6.1	1,414,000	7.8	342,000	4.5	537,000	14.7	2,785,000	7.4
Total	8,069,000		18,101,000		7,598,000		3,649,000		37,417,000	

+ or — columns are changes over previous week.

Gasoline Shipments Gain but Stocks Also Rise

Staff Special—By Telegraph
TULSA, Oct. 25

GASOLINE shipments from 124 refineries in the Mid-Continent field that have about 60 per cent of the operating capacity of the field increased their shipments of gasoline nearly 5,000,000 gallons in the week ended Oct. 21, they reported to NATIONAL PETROLEUM NEWS. Gasoline shipped totaled 36,300,00 gallons, compared with 31,102,000 gallons in the week ended Oct. 14.

The largest increases in shipments were reported by refiners in Oklahoma and north Texas. Oklahoma refiners reported gasoline shipments of 16,625,000 gallons, an increase of 3,373,000 gallons over shipments of the preceding week. North Texas shipments totaled 7,612,000 gallons, compared with 6,413,000 gallons the week before, an increase of 1,200,000 gallons.

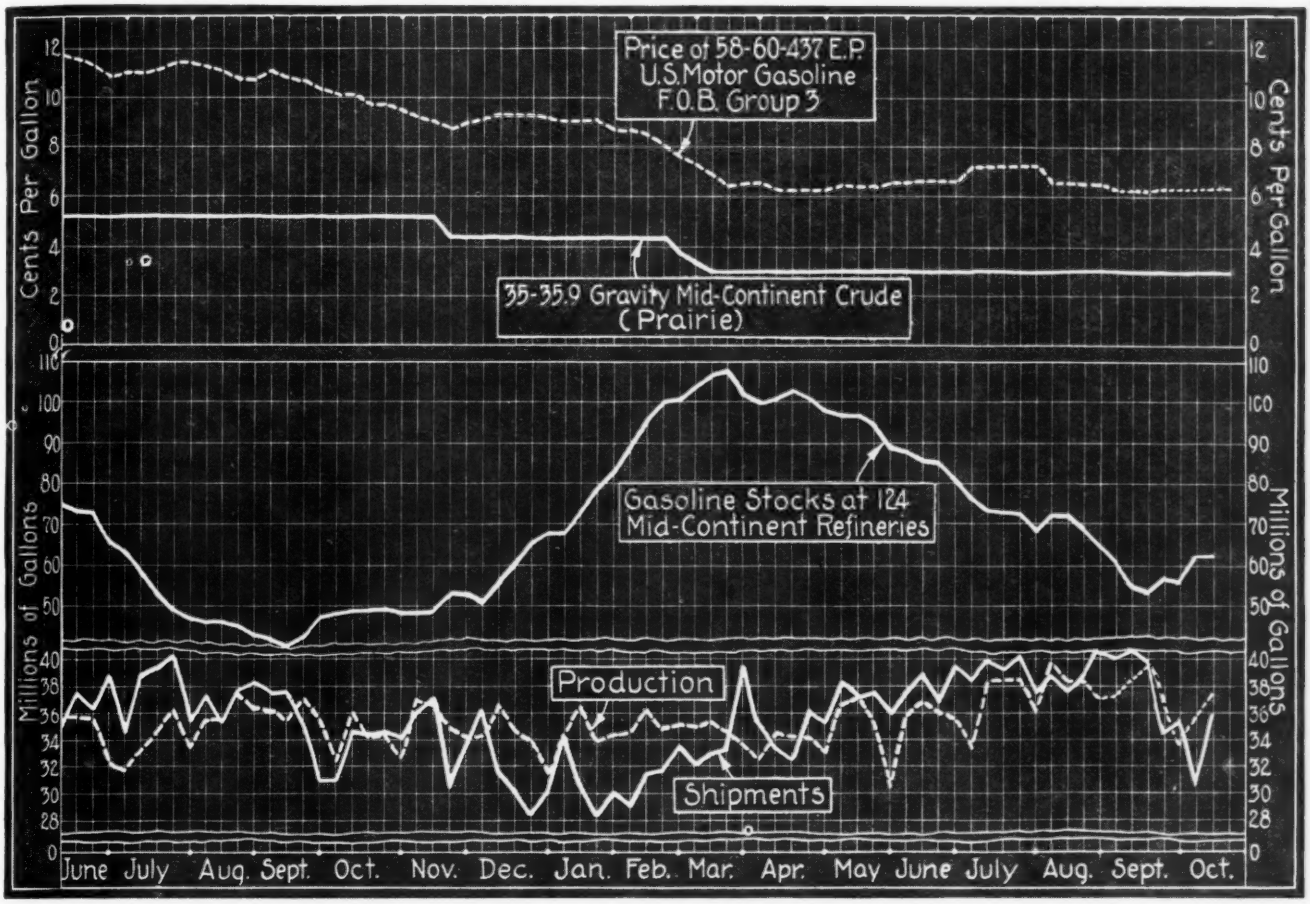
Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Oct. 21. Change in stocks figured from Sept. 23.

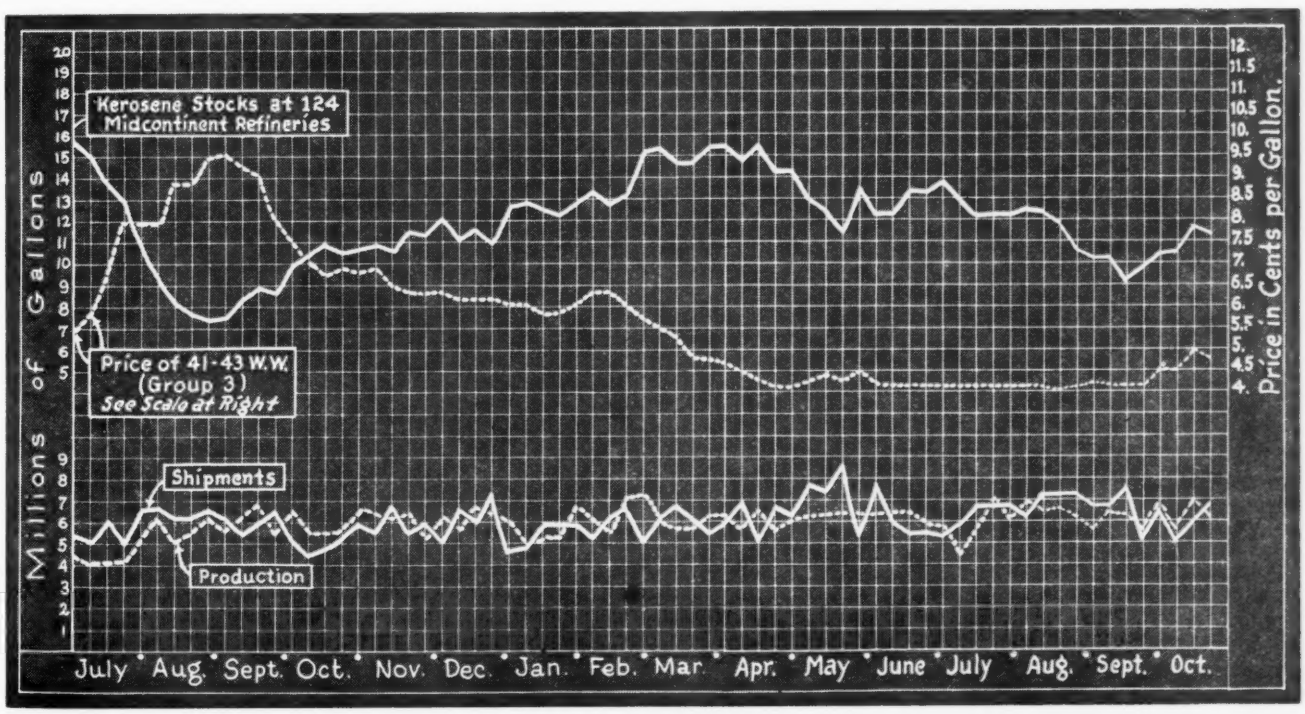
	Gallons
GASOLINE	
Production	144,002,000
Shipments	136,919,000
Net change in stocks	+7,083,000
Ratio sales to production	95.1%
KEROSENE	
Production	24,879,000
Shipments	23,442,000
Net change in stocks	+1,437,000
Ratio sales to production	94.2%
STOVE DISTILLATE	
Production	6,586,000
Shipments	6,978,000
Net change in stocks	—392,000
Ratio sales to production	106.0%
GAS OIL	
Production	25,158,000
Shipments	26,388,000
Net change in stocks	—1,230,000
Ratio sales to production	104.9%
FUEL OIL	
Production	105,754,000
Shipments	103,914,000
Net change in stocks	+1,840,000
Ratio sales to production	98.3%

Barometer of Mid-Continent Refinery Market—Week Ending October 21

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News

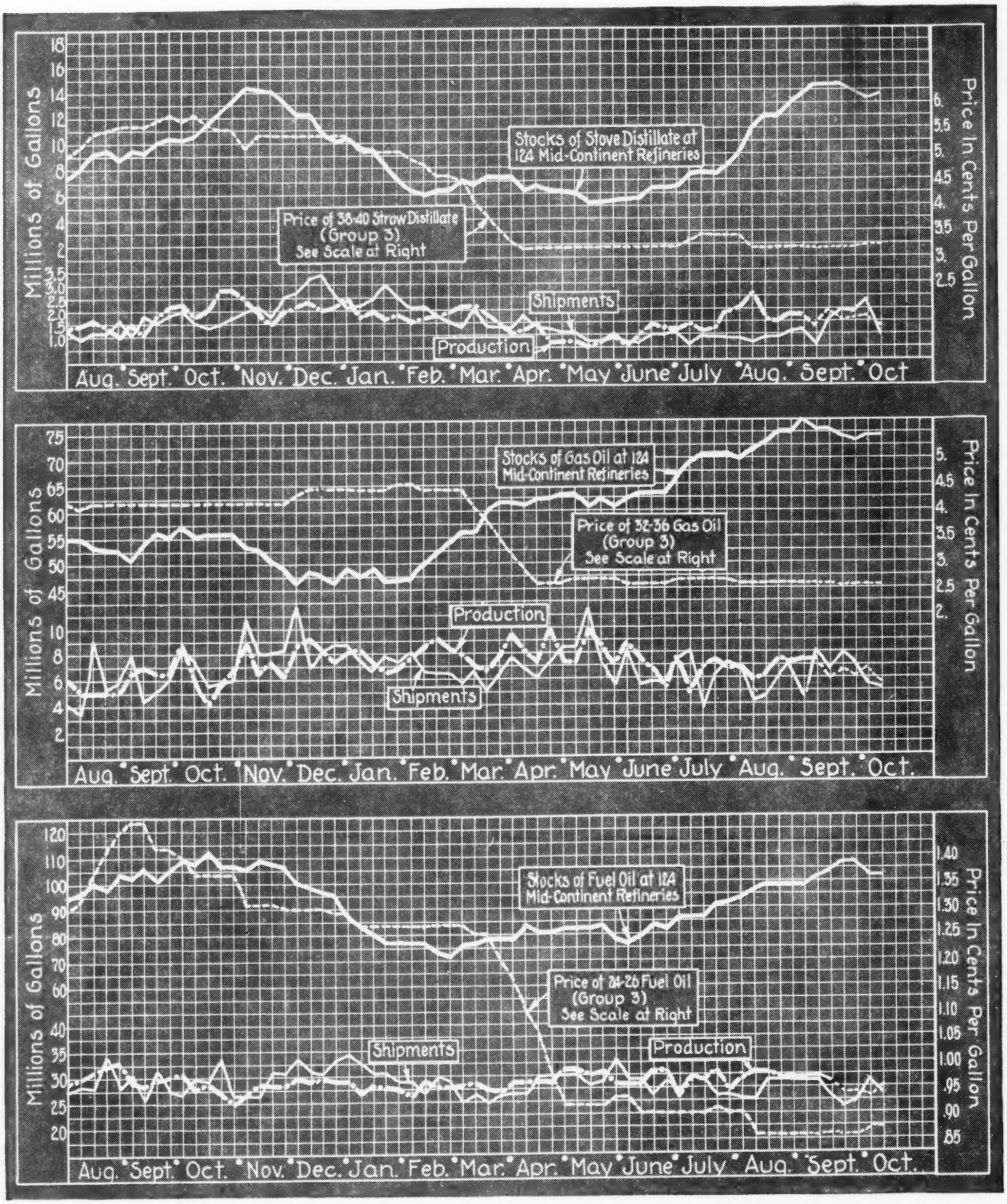

Price of 58-60-437 E.P. U.S. Motor Gasoline F.O.B. Group 3
35-35.9 Gravity Mid-Continent Crude (Prairie)
Cents Per Gallon
Gasoline Stocks at 124 Mid-Continent Refineries
Millions of Gallons
Production
Shipments
June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date shown in table on opposite page


Kerosene Stocks at 124 Midcontinent Refineries
Price of 41-43 W.W. (Group 3) See Scale at Right
Millions of Gallons
Price in Cents per Gallon
Shipments
Production
July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.

Barometer of Mid-Continent Refinery Market—Week Ending October 21

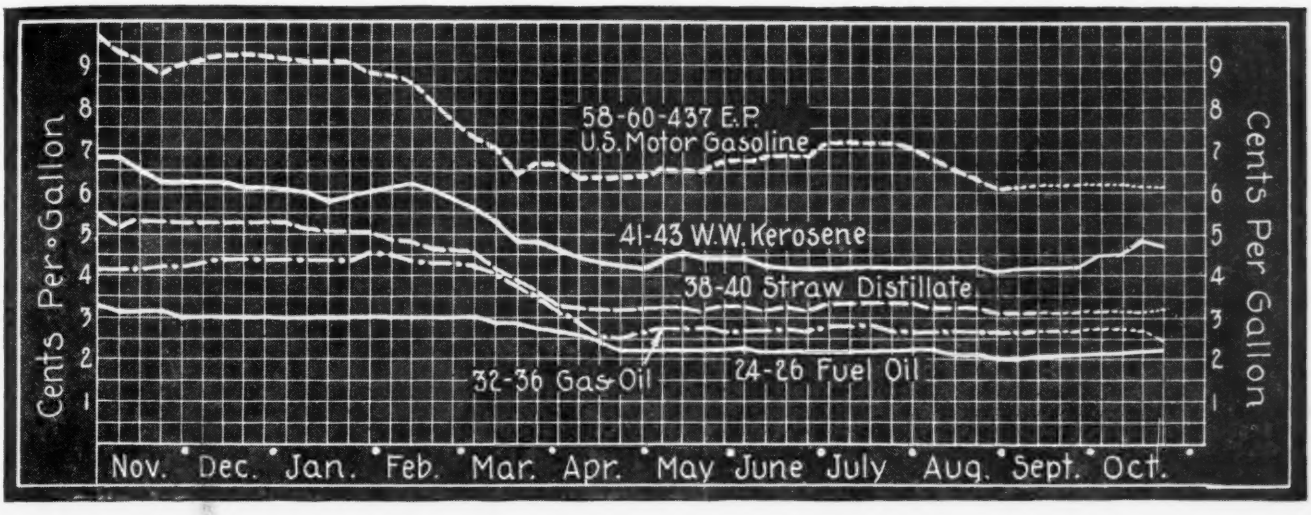
Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News


Millions of Gallons
Price In Cents Per Gallon
Stocks of Stove Distillate at 124 Mid-Continent Refineries
Price of 38-40 Straw Distillate (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct
Millions of Gallons
Price In Cents Per Gallon
Stocks of Gas Oil at 124 Mid-Continent Refineries
Price of 32-36 Gas Oil (Group 3) See Scale at Right
Production
Shipments
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.
Millions of Gallons
Price In Cents Per Gallon
Stocks of Fuel Oil at 124 Mid-Continent Refineries
Price of 24-26 Fuel Oil (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.

Larger shipments of gasoline encouraged refiners to increase crude oil charges to stills 6,341 barrels daily average to 269,925 barrels a day. The largest increase in runs was made by the Oklahoma group which reported average crude charges to stills of 111,498 barrels a day, against 105,189 barrels a day the previous week. An increase of 5,500 barrels daily average to 65,253 barrels a day was reported by north Texas plants but both Kansas and north Louisiana and Arkansas refiners reduced their crude runs, the latter group by 4,500 barrels to an average of 38,267 barrels.

The increase in crude runs brought gasoline production of the entire field up 2,000,0000 gallons to 37,417,-000 gallons. Stocks were increased

Current Prices of Principal Mid-Continent Refined Products


58-60-437 E.P.
U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Cents Per Gallon
Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.

Prices shown above are on Group 3 basis and extended to date shown in Refinery Market Tables in Market Section of this Issue

1,400,000 gallons to 61,861,000 gallons. Both Kansas and north Texas refiners reported minor drafts on gasoline stocks while Oklahoma and north Louisiana-Arkansas group reported additions to inventories.

Shipments were begun on some of the large recent orders for kerosene. The new business brought total shipments from the field up to 6,565,000 gallons, an increase of 1,000,000 gallons or 18.2 per cent. Total stocks of kerosene were reduced 150,000 gallons to 11,329,000 gallons.

The warm weather brought shipments of stove distillate to about a third of what they were in the second week of October. Shipments totaled 832,000 gallons, a decrease of 64.9 per cent. Production totaled 1,425,000 gallons. Stocks Oct. 21 were 13,695,000 gallons. A year ago on Oct. 22 stove distillate stocks totaled 12,358,000 gallons at the same group of refineries.

Gas oil shipments also fell, although not so much as stove distillate. Shipments totaled 5,354,000 gallons and production was 5,777,000 gallons. Stock increased 500,000 gallons to 74,838,000 gallons.

The increase in crude runs brought fuel oil production up 1,500,000 gallons to 27,556,000 gallons. Shipments dropped slightly to 26,405,000 gallons. Stocks increased 105,774 gallons to 1,150,000 gallons, a gain of 1.1 per cent.

The Lincoln Electric Co., Cleveland, O., manufacturer of Linc-Weld motors and stable-arc welders, has appointed E. A. Thornwell of Atlanta, Ga. as its representative in Georgia and eastern Tennessee. John Van Horn, factory engineer for the company is assistant to Mr. Thornwell.

Supreme Court to Pass On Price Fixing Act

NORFOLK, Va., Oct. 21.—A decision on the constitutionality of the Tennessee gasoline price fixing statute may be expected from the United States Supreme Court this coming winter, Mark A. Senter, Southeastern Oil Co., Chattanooga, Tenn., said today. Mr. Senter, who is president of the Tennessee jobbers' association, attended the convention of the Virginia Independent Oil Men's Association today.

Tennessee gasoline distributors won a decision over the state before a tribunal of three federal judges some time ago. The state appealed to the Supreme Court, the prescribed procedure in cases where the constitutionality of a state law is questioned.

Pioneer Oil Lawyer Dead in Texas

HOUSTON, Oct. 20.—Funeral services were held at Corsicana for William Junius McKie, 72, formerly general attorney for The Texas Co., who died at his Corsicana home, Oct. 17. Judge McKie wrote the charter under which The Texas Co. originally operated; also he was counsel for many years for the Lone Star Gas Co., and for the Magnolia Petroleum Co., before its headquarters were transferred from Corsicana to Dallas.

The later years of Judge McKie's life were enriched by royalties from a farm owned by him in the heart of the Powell field, southeast of Corsicana. It was on this property that the first big well of the field caught fire and burned, resulting in the death of 13 persons.

Judge McKie leaves a widow and four children, Francis B., Ben W., Evelyn and Blanche McKie, all of Corsicana, and a brother, Ben McKie, of Waco.

121 Seminole Producing Wells to be Shot

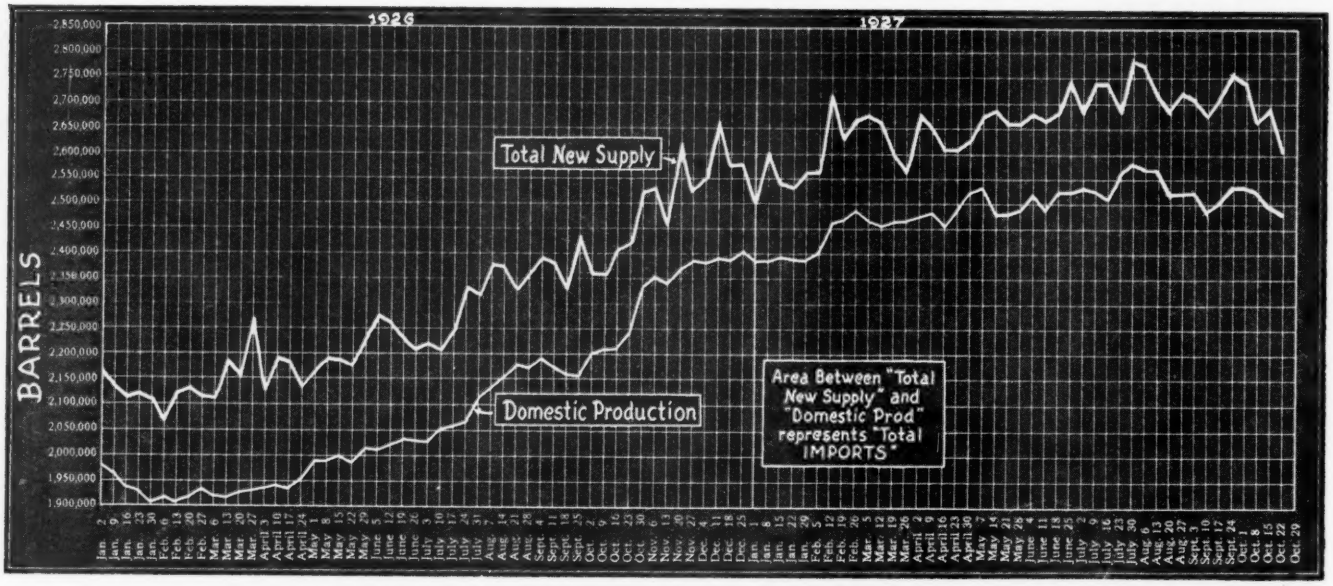
TULSA, Oct. 25.—A committee of Seminole operators and Umpire Collins Monday granted permission to shoot 121 wells in the Seminole district. The agreement not to shoot except on permission has been faithfully observed to date. Most of the authorized shots are for wells whose production has dropped to 200 barrels and less and the chief reason for shooting is in connection with cleaning out preparatory to pumping. It is not expected that the shooting will result in much increase in production and that only temporary. Twenty-nine of the wells are in Earlsboro. The restriction was lifted entirely in Searight where production is dropping fast. No wells in Little River are included in the list of authorized shots.

California Acreage Deal Under Way

LOS ANGELES, Calif., Oct. 22—One of the largest deals in oil field acreage in California in recent months, is pending this week, whereby the Elbe Oil Co. sells a major portion of its 3500-acre lease at Pound Mountain, to Shell Co., and Honolulu Consolidated Oil Co. at a reported consideration of $2,000,000 cash and one-third of the profits from future operations. L. S. Barnes is president of the Elbe Oil Company and principal owner.

The Round Mountain area is about 14 miles north of Bakersfield, in Kern county.

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below as compiled by American Petroleum Institute

PRODUCTION SUMMARY

	Oct. 22	Oct. 15
Production east of Rockies	1,856,850	1,865,150
Decrease		8,300
Total production in U. S.	2,481,750	*2,494,350
Decrease		12,600
Crude oil imports	119,571	192,714
Decrease		73,143
Total crude supply	2,601,321	2,687,064
Decrease		85,743

*Revised. Due to typographical error this figure was shown as 2,491,350 instead of 2,494,350.

OKLAHOMA

	Oct. 22	Oct. 15
North Braman	2,550	2,600
South Braman	2,250	2,400
Blackwell	3,950	3,950
Hubbard	3,300	3,750
Thomas	3,050	3,250
Tonkawa	17,900	18,050
Garber	10,200	10,400
Burbank	35,450	35,000
Osage, outside Burbank	30,650	30,650
Watchorn	1,700	1,800
Cushing	21,250	21,250
Yale Jennings	9,600	9,650
Davenport	2,700	2,800
Bristow-Slick	24,850	24,900
North Okmulgee	16,200	16,200
Lyons-Deaner	6,500	6,300
Stroud	1,300	1,250
Cromwell	11,450	11,600
Papoose	6,200	6,200
Wewoka	14,200	13,700
Seminole	68,150	68,950
Bowlegs	125,650	130,950
Searight	26,950	29,700
Little River	44,400	39,550
Earlsboro	166,400	172,400
Duncan district	6,950	7,000
Graham	6,500	6,500
Fox	1,900	1,900
Healdton	14,950	15,000
Hewitt	9,400	9,500
	13,500	14,000
Others	69,200	69,050
Total Oklahoma	779,200	790,200
Decrease		11,000

KANSAS

Greenwood County	32,350	32,500
Florence-Covert	1,500	1,500
Peabody-Elbing	3,850	3,850
Eldorado-Towanda	14,250	14,250
Augusta-Fox-Bush	4,250	4,250
Rainbow Bend	2,150	2,100
Russell	2,500	2,500
Churchill	13,800	13,800
Others	30,300	30,000
Total, Kansas	104,950	104,750
Increase		200

NORTH LOUISIANA

Homer	4,750	4,750
Haynesville	7,150	7,150
Caddo, light	13,100	13,450
Caddo, heavy	4,550	4,800
De Soto, Red River	4,300	4,050
Elm Grove	700	650
Bellevue	1,250	1,250
Cotton Valley	5,200	5,150
Urania	9,300	9,300
Pleasant Hill	750	1,050
Total, North Louisiana	51,050	51,600
Decrease		550

ARKANSAS

El Dorado	6,150	6,150
Smackover, light	10,000	10,000
Smackover, heavy	77,450	77,550
Stephens	1,200	1,200
Nevada	2,950	3,050
Lisbon	3,050	3,000
Others	100	100
Total, Arkansas	100,900	101,050
Decrease		150

TEXAS (OUTSIDE GULF COAST)

Panhandle District

Hutchinson County	65,700	66,300
Carson County	8,100	8,400
Gray County	13,500	14,100
Wheeler County	1,350	1,350
Others	50	50
Total, Panhandle District	88,700	90,200
Decrease		1,500

North Texas

Burkburnett	12,900	13,000
Electro	12,500	12,750
Iowa Park and K-M-A	2,250	2,400
Wilbarger	11,800	12,000
Archer County	23,000	24,800
Montague-Cooke	16,250	16,600
Others	600	600
Total, N. Texas	79,300	82,150
Decrease		2,850

West Central Texas

Stephens County	8,500	8,250
Eastland-Desdemona	8,950	8,800
Brown County	20,000	21,500
Coleman County	1,050	1,050
Callahan County	4,00	4,200
Shackleford County	5,000	5,200
Young County	10,000	10,100
Throckmorton County	1,200	1,300
Palo Pinto County	600	600
Others	1,400	1,400
Total, W. Central Texas	60,700	62,400
Decrease		1,700

West Texas

Jones County	1,650	1,500
Mitchell and Scurry Counties	3,650	3,500
Howard County	3,200	3,400
Reagan County	23,400	23,250
Crane and Upton Counties	132,500	132,200
Crockett County	2,100	1,850
Pecos County	31,400	27,100
Winkler	10,300	10,500
Others	2,800	2,650
Total, W. Texas	211,000	205,950
Increase		5,050

East Central Texas

Mexia	9,050	9,200
Currie	650	650
Richland	700	700
Wortham	2,600	2,650
Corsicana-Powell	13,850	14,000
Nigger Creek	1,400	1,500
Total, East Central Texas	28,250	28,700
Decrease		450

Southwest Texas

Luling	15,000	15,050
Lytton Springs	1,650	1,800
Somerset	850	850
Laredo District	8,500	8,800
Dale	300	400
Others	400	450
Total, Southwest Texas	26,700	27,350
Decrease		650
Total, Texas—(Outside Gulf Coast)	494,650	496,750
Decrease		2,100

GULF COAST

Coastal Texas

West Columbia	8,900	9,000
Damon Mound	850	900
Big Creek	3,800	4,600
Boling	2,400	2,400
Blue Ridge	3,500	3,750
Pierce Junction	7,500	7,950
Humble	2,000	2,000
Goose Creek	8,000	7,800
South Liberty	2,000	2,400
Hull	17,050	16,000
Saratoga	1,100	900
Batson	1,300	1,400
Sour Lake	4,200	4,200
Spindletop	53,550	49,200
Orange County	4,100	4,400
Others	3,000	3,350
Total, Coastal Texas	123,250	120,250
Increase		3,000

Coastal Louisiana

Vinton	4,850	4,950
Lockport	5,600	5,700
Evangeline	1,350	1,300
Edgerly	2,300	1,850
Others	1,300	1,400
Total, Coastal Louisiana	15,400	15,200
Increase		200
Total Gulf Coast	138,650	135,450
Increase		3,200

ROCKY MOUNTAIN

Wyoming

Salt Creek	32,400	32,600
Grass Creek	2,700	2,600
Elk Basin	1,250	1,050
Big Muddy	2,950	2,750
Lost Soldier	2,350	2,600
Rock River	2,600	2,700
Lance Creek	1,350	600
Teapot Dome	950	850
Others	4,400	4,250
Total, Wyoming	50,950	50,000
Increase		950

Montana

Cat Creek	2,000	2,000
Sunburst	11,500	11,500
Others	200	250
Total, Montana	13,700	13,750
Decrease		50

Colorado

Moffat (Craig)	1,500	1,500
Fort Collins	2,700	2,800
Florence	800	900
Others	1,400	1,200
Total, Colorado	6,400	6,400

New Mexico

Table Mesa	100	.....
Artesia	1,400	1,400
Hogback	300	250
Rattlesnake	.....	400
Others	100	150
Total, N. Mexico	1,900	2,200
Decrease		300
Total, Rocky Mountain	72,950	72,350
Increase		600

California

Santa Fe Springs	39,000	39,000
Long Beach	93,000	91,500
Huntington Beach	61,500	63,000
Torrance	20,000	20,500
Dominguez	15,000	15,000
Rosecrans	7,500	8,000
Inglewood	32,500	33,000
Midway-Sunset	84,000	84,000
Ventura Avenue	55,400	56,200
Seal Beach	59,000	62,000
Others	158,000	157,000
Total California	624,900	629,200
Decrease		4,300

Eastern

(Including Ill., Ind., Ky., Ohio, W. Va., Pa., and N. Y.)	114,500	113,000
Increase		1,500

Continued Decline in Seminole District Starts Much Hopeful Talk

By Lawrence E. Smith
N. P. N. STAFF WRITER

TULSA, Oct. 22

UP ONE day and down the next, but showing a general tendency to keep on slipping, the Seminole district performed in a manner during the past week to occasion a cheerful tone. Producers are an optimistic lot and seize upon any comforting fact, hence right now some of the guessing is on the following point: Where will the next new field be found?

The Seminole decline this time is authentic and with nothing in sight to offset it, but it is still making very much oil per diem and will continue so to do for quite a while. It has not yet reached the point where predictions of price increase are warranted, although some of these have been heard.

Considering the dates of Oct. 14 and Oct. 21, comparison of the gain or loss in the production of those two days is as follows:

Earlsboro gained 16 wells and lost 9,166 barrels; Little River added 10 wells and gained 4.816 barrels; Searight added 2 wells and lost 3,324 barrels; Bowlegs lost one well and 7,366 barrels; Seminole gained 4 wells and lost 2.709 barrels. The total for the district was a gain of 25 wells and a decline of 19,749 barrels.

The daily average per well as of these two dates declined from 490 to 455 barrels.

Little River failed to better its performance materially during the week and such development as there was strengthened the conviction that peak production will not greatly exceed 75.000 barrels. Nearly every well that is completed now is put on the swab immediately and presently on air lift if it makes enough initially to warrant the installation.

No field in the district had a completion out of the ordinary during the week and the limits of all are pretty well established. From here on it is a job of finishing up the drilling that is under way—quite a sizeable program at that—with prospects that completions will not more than momentarily check the decline at any stage.

That goes for the five fields now producing. Daily the chances for new pools to be opened by wildcats now drilling are lessened and the wildcatters are not starting anything new.

In the Bowlegs district the Gypsy Oil Co. and Prairie Oil & Gas Co.'s semiwildcat in the NW SE NE of 18-8-6 is a Wilcox failure at 4434 feet. A half mile due north of this, however, the Gypsy got some encouragement in its test in the SE NE of 7-8-6. Top of the Hunton formation was found at 4234 feet and top of the Sylvan shale at 4260 feet, from where it was drilling with the hole full of oil. No attempt was made to produce the Hunton oil.

For several months there has been considerable prodding around in the vicinity of the old Allen field of northeast Pontotoc county, which is southeast of the Seminole district, in the attempt to find the extensions, if any, of that field. The Louisiana Oil & Refining Corp. has had a little luck. Its No. 2 McElroy, in the SW SE of 17-5N-8E, which some days ago made about 20 million feet of gas and was rated as being good for 1,000 barrels of oil, is making between 500 and 600 barrels daily, partly shut in on account of having no way to use the gas. The oil is cutting about 3 per cent, one theory advanced for this being the presence of considerable rotary mud in the hole. This well is northwest of the old field and in the vicinity where several large gas wells have been drilled this year. Pay in the McElroy well was found at 2447-74 feet.

Southwest of the Pearson pool of Pottawatomie county. the Magnolia Petroleum Co. got 253 barrels in 24 hours in its test in the NE NE SW of 25-7-3. The oil came from the Viola lime at 4180-84 feet. The test will be continued to the Wilcox.

In Kansas the chief item of interest was the discovery of oil in the Silicious lime, a horizon below the Wilcox sand, in its No. 1 S. Thurlow test, SE NE of 7-33S-3E, Cowley county. This is about a mile north of the north limits of the Rainbow Bend pool and is the second Silicious lime well in the area. Top of this lime was found at 3.487 feet and the drill went to 3.490 feet. From this level it flowed 27 barrels per hour initial of 41 gravity oil.

The other well to produce from this horizon in the area is the same company's southeast offset which found the top of the formation 10 feet lower, was drilled to 3 595 feet and made 180 barrels when drilled in early this year.

Stalcup Made Director Of Skelly Oil Co.

H. M. STALCUP

Staff Special

TULSA, Oct. 22.—H. M. Stalcup, vice-president of the Skelly Oil Co. in charge of production, was elected a director of the company at the annual meeting of stockholders Oct. 18.

Mr. Stalcup came into the oil industry in 1917 after serving 11 years as a banker at McAlester, Okla. His first oil association was with J. B. Foster, independent producer, and this connection gave him much field experience in Oklahoma, Kansas and Louisiana.

He entered the Skelly organization in May, 1923, as executive assistant to President Skelly and Vice-President Herndon. He became vice-president in April, 1925.

LOS ANGELES, Oct. 21.—Word was received at Whittier this week of the death of Emmett H. McMann, superintendent for Shell Co., in Orange county, at Las Begas, Nev., hospital as the result of an automobile accident during a hunting trip in Nevada. He was accompanied by Walker Kuhn and late this week no details of the accident were available. Mr. McMann had been in the oil business most of his business life, living for some time in Kern County. He is survived by his wife and three children.

Seminole District Production by Companies and Leases, October 21 and October 14, 1927

Company	Farm	S.T.R.	Oct. 21 No. Wells	Oct. 21 Prod.	Oct. 14 No. Wells	Oct. 14 Prod.
BOWLEGS						
Amerada	Rascoe	15- 8-6	8	4,500	8	5,300
Atlantic	Baker	1- 8-6	4	1,369	4	1,550
Atlantic	Fleet	23- 8-6	4	1,507	4	1,338
Atlantic	Grayson	12- 8-6	2	2,059	2	2,208
Atlantic	A. Jones	16- 8-6	3	203	3	205
Atlantic	C. Jones	9- 8-6	1	872	1	789
Total Atlantic			14	6,010	14	5,301
Barnsdall	McNac	28- 8-6	1	40	1	50
Barnsdall	Murrow	11- 8-6	4	1,614	4	1,762
Total Barnsdall			5	1.654	5	1,812
Carter	Bowlegs	15- 8-6	3	1,670	3	1,690
Carter	Burden	23- 8-6	2	410	2	410
Carter	Jones	11- 8-6	2	2,660	1	2,045
Carter	Harjoche	15- 8-6	6	1,420	6	1,675
Carter	Hilly	23- 8-6	1	1,205	1	1,285
Carter	Walker	15- 8-6	2	640	2	710
Carter	Wise	23- 8-6	12	9,045	12	9,515
Total Carter			30	17,050	28	17,338
Empire	Lacey	15- 8-6	6	1,189	6	1,129
Empire	Wise	23- 8-6	2	1,630	2	1,797
Total Empire			8	2,819	8	2,926
Gypsy	Bowlegs	22- 8-6	1	400	1	450
Gypsy	Brown	33- 8-6	1	100	1	100
Gypsy	Cumsey	8- 8-6	4	1,497	4	1,550
Gypsy	Grayson	13- 8-6	4	2,920	4	2,805
Gypsy	Walker	15- 8-6	8	3,399	8	3,285
Gypsy	Wise	23- 8-6	3	62	3	148
Total Gypsy			21	11,197	21	8,343
Independent et al	Coker	21- 8-6	1	126	1	10
I. T. I. O.	Barnett	24- 8-6	2	699	2	936
I. T. I. O.	Billington	22- 8-6	4	1,189	4	1,211
I. T. I. O.	Bowlegs	22- 8-6	11	2,224	11	2,707
I. T. I. O.	Davis	13- 8-6	4	1,722	4	2,017
I. T. I. O.	Fay	18- 8-6	5	4,482	5	4,207
I. T. I. O.	Goforth	15- 8-6	11	1,997	11	2,707
I. T. I. O.	Hull	26- 8-6	1	170	1	279
I. T. I. O.	Livingston	15- 8-6	11	7,248	11	7,751
I. T. I. O.	Lizzie	11- 8-6	2	533	2	608
I. T. I. O.	Walker	15- 8-6	8	1,476	8	1,529
I. T. I. O.	Wilmont	15- 8-6	4	2,179	4	2,324
I. T. I. O.	Work	24- 8-6	1	22	1	231
I. T. I. O.	Youngblood	23- 8-6	2	575	4	570
Total I. T. I. O.			66	24,516	68	27,077
McCulloch	Bowlegs	22- 8-6	3	340	3	260
Magnolia	Hammond	10- 8-6	2	96	2	112
Mid-Continent	Baker	10- 8-6	4	3,212	4	3,519
Mid-Continent	Bowlegs	22- 8-6	1	615	1	700
Total Mid-Continent			5	3,829	5	4,219
Minnehoma	Bowlegs	15- 8-6	4	487	4	557
Prairie	Gahagan	23- 8-6	4	869	4	880
Prairie	Harber	10- 8-6	7	3,145	7	3,245
Prairie	Jones	11- 8-6	2	2,160	2	1,970
Prairie	Templeton	12- 8-6	1	2,300	1	2,415
Prairie	Whitney	23- 8-6	4	180	4	80
Total Prairie			18	8,654	18	7,590
Pure	Reed	14- 8-6	16	8,161	16	8,727
Pure	D. Strother	14- 8-6	3	959	2	1,004
Pure	F. Strother	10- 8-6	1	616	1	616
Total Pure			20	9,736	19	10,352
Roxana et al	Taylor	16- 8-6	6	2,162	6	2,187
Shaffer	Lacey	14- 8-6	3	727	3	537
Sinclair	Bowlegs	22- 8-6	1	60	1	120
Sinclair	Cumsey	10- 8-6	2	3,626	2	4,038
Sinclair	Ellen	11- 8-6	6	3,944	6	4,510
Sinclair	Harjo	14- 8-6	3	1,885	3	1,660
Sinclair	Jones	8- 8-6	4	7,079	4	7,730
Sinclair	Taylor	10- 8-6	4	3,855	4	4,109
Sinclair	Walker	22- 8-6	4	1,580	4	1,755
Total Sinclair			24	22,029	24	24,922
Texas	Reed	14- 8-6	8	6,250	8	6,445
Tidal	Grayson	13- 8-6	3	1,650	3	1,720
Tidal	Harjoche	10- 8-6	4	1,975	4	2,420
Total Tidal			7	3,625	7	4,140
Twin State	Jones	11- 8-6	2	1,390	1	535
Total Bowlegs			256	123,378	257	130,744
LITTLE RIVER						
Amerada	Fore	35- 8-6	1	1,675	1	895
Blackwell	Nitey	35- 8-6	7	7,053	6	5,855
Carter	Fish	1- 7-6	1	85	0	0
Continental	Cozar	2- 7-6	1	1,255	0	0
Gypsy	Campbell	36- 8-6	1	1,999	1	1,405
Gypsy	Nungee	1- 8-6	0	0	1	120
Gypsy	Pottey	35- 8-6	1	2,077	1	947
Total Gypsy			2	4,076	3	2,372
I. T. I. O.	Dungan	35- 8-6	3	2,743	2	3,218
I. T. I. O.	WE House-A	1- 7-6	1	549	1	1,512
I. T. I. O.	WE House-B	2- 7-6	1	1,189	1	2,130
I. T. I. O.	MA House	1- 7-6	1	1,348	1	2,958
I. T. I. O.	Jackson	1- 7-6	3	4,605	2	4,223
I. T. I. O.	Nitey	2- 7-6	3	3,810	3	7,393
I. T. I. O.	Reed	1- 7-6	1	1,189	1	1,857
I. T. I. O.	Soketneche	1- 7-6	2	962	1	334
Total Ind. Terr.			15	16,395	12	23,635
Mid-Continent	Wadsworth	36- 8-6	5	2,265	4	2,660
Philmack	Reed	1- 7-6	1	685	1	400
P & R	Dungan	35- 8-6	1	900	1	1,460
P & R	House	2- 7-6	2	3,665	1	652
Total P & R			3	4,565	2	2,112
Roxana	Jimpsey	1- 7-6	1	90	0	0
Superior	Wadsworth	1- 7-6	1	101	1	139
Tidal	House	1- 7-6	2	3,080	2	50
Tidal	Johnson	1- 7-6	1	0	1	300
Total Tidal			3	3.080	3	350
Total Little River			43	41,334	33	38,518
EARLSBORO						
Amerada	Anderson	15- 8-6	5	2,590	4	2,990
Amerada	Cowden	4- 9-5	6	2,355	6	2,295
Amerada	Rodgers	3- 9-5	2	3,110	2	3,535
Total Amerada			13	8,055	12	8,820
Barnsdall	Brown	10- 9-5	4	3,802	3	2,604
Barnsdall	N Bruner	11- 9-5	3	4,766	3	5,465
Barnsdall	Cudjo	11- 9-5	1	30	1	21
Barnsdall	D Davis	11- 9-5	3	2,136	3	2,075
Barnsdall	J Davis	11- 9-5	2	1,461	2	535
Barnsdall	M Davis	11- 9-5	3	1,628	3	1,852
Barnsdall	Gibson	9- 9-5	6	1,363	6	1,767
Barnsdall	Hearn	15- 9-6	1	17	1	16
Barnsdall	Ingram	4- 9-5	5	4,662	2	1,842
Barnsdall	Pack	10- 9-5	4	844	4	1,058
Barnsdall	Peter	10- 9-5	4	760	4	506
Barnsdall	Sango	2- 9-5	1	120	1	107
Barnsdall	Sebolka	15- 9-5	1	2,327	1	2,108
Barsndall	Sullivan	11- 9-5	2	620	2	1,356
Barnsdall	Sullivan	10- 9-5	3	54	3	127
Barnsdall	Watsutke	12- 9-5	3	1,379	3	3,629
Total Barnsdall			46	26,459	43	25,068
Carter	Davis	13- 9-5	1	265	1	790
Carter	Payne	12- 9-5	2	1,775	2	1,500
Carter	Sango	2- 9-5	2	3,185	2	1,835
Total Carter			5	5,525	5	4,125
Continental	Kays	2- 9-5	1	420	0	0
Continental	Spencer	12- 9-5	4	10,860	4	9,985
Crosbie	Bryant	9- 9-5	2	2,610	2	2,687
Empire	Edmundson	3- 9-5	3	3,065	3	3,591
Gypsy	Bruner	10- 9-5	4	3,472	4	4,335
Gypsy	Carter	11- 9-5	8	3,975	6	3,460
Gypsy	Hunick	5- 9-5	1	447	1	442
Gypsy	Noble	12- 9-5	3	11,952	3	13,457
Gypsy	Peter	10- 9-5	5	1,212	5	1,490
Gypsy	State	16- 9-5	4	567	4	342
Gypsy	Sango	1- 9-5	2	870	0	0
Total Gypsy			27	22,505	26	23,528
Independent	Bruner	10- 9-5	4	5,372	4	4,842
Independent	Gaines	11- 9-5	3	9,195	3	8,275
Independent	Knappen	8- 8-5	5	3,450	4	2,225
Independent	O'Dell	4- 9-5	4	1,225	4	2,220
Independent	Sullivan	10- 9-5	4	535	4	646
Total Independent			20	19,777	19	23,528
Interocean	Payne	12- 9-5	1	75	0	0
Magnolia	Bryant	9- 9-5	4	1,802	4	1,915
Magnolia	Cowden	4- 9-5	2	440	2	510
Magnolia	Edmundson	3- 9-5	2	937	2	1,169
Magnolia	Holmsley	11- 9-5	5	3,176	5	4,647
Magnolia	Ingram	10- 9-5	1	22	1	35
Magnolia	Lena	10- 9-5	3	450	3	352
Magnolia	Seay	12- 9-5	4	1,239	4	2,273
Magnolia	Simpson	10- 9-5	4	371	4	662
Magnolia	Sparks	11- 9-5	7	4,477	7	5,281
Magnolia	Sullivan	12- 9-5	2	3,540	2	64
Total Magnolia			34	16,454	34	16,908
Mid-Continent	McCumber	9- 9-5	7	1,890	7	1,480
Mid-Kansas	Anderson	14- 9-5	2	685	2	190
Phillips	Dunnaway	15- 9-5	1	35	1	47
Phillips	Graham	9- 9-5	6	825	6	959
Total Phillips			7	860	7	1,016
Prairie	Baker	23- 9-5	1	50	1	45
Prairie	Davis	13- 9-5	4	1,440	3	1,395
Prairie	C Graham	3- 9-5	2	1,055	4	2,365
Prairie	O Graham	10- 9-5	4	4,375	2	5,040
Prairie	Stidham	11- 9-5	13	8,015	10	9,170
Total Prairie			24	14,935	20	18,015
Roxana	Bayliss	17- 9-5	1	17	1	17
Roxana	Spencer	12- 9-5	2	1,795	2	2,453
Total Roxana			3	1,812	3	2,470
Shaffer	Clark	1- 9-5	2	147	1	347
Sinclair	Foreman	18- 9-5	1	15	1	18
Sinclair	Hollins	12- 9-5	3	2,240	3	5,270
Total Sinclair			4	2,255	4	5,288
Skelly	Spencer	12- 9-5	2	4,657	2	7,798
Texas	Anderson	2- 9-5	1	145	1	95
Texas	Brown	10- 9-5	4	1,850	3	1,893
Texas	Rodgers	5- 9-5	2	7,240	2	7,280
Texas	Wilmont	10- 9-5	5	762	4	220
Total Texas			12	9,997	10	9,230
Tidal	Watkins	9- 9-5	4	2,760	4	2,425
Twin State	Baker	12- 9-5	3	4,720	3	8,365
Twin State	Hearn	2- 9-5	2	1,835	1	1,710
Total Twin State.			5	6,555	4	10,075
TOTAL EARLSBORO			234	162,068	218	171,234
TOTAL LITTLE RIVER			43	41,334	33	38,518
TOTAL SEARIGHT			58	26,266	60	29,590
TOTAL BOWLEGS			256	123,378	257	130,744
TOTAL SEMINOLE			330	66,647	326	69,356
GRAND TOTAL SEMINOLE DISTRICT			921	419,693	896	439,442
Avg. Per Well				455		490

Completions in Oklahoma and Kansas, Week Ended October 22, 1927

OKLAHOMA

Beckham County

Company	Well No.	Location	Depth	Init. Prod.
Bucy-Clay	1	NEc SW NE 21-9-23 W	2615-2705	40M

Caddo County

Company	Well No.	Location	Depth	Init. Prod.
Morgan et al	1	SEc NE NW 5-5-9 W	2150-2410	25

Carter County

Company	Well No.	Location	Depth	Init. Prod.
Franklin et al	6	NEc NW NW 3-2-3 W	2280-3200 OWD	15

Creek County

Company	Well No.	Location	Depth	Init. Prod.
Redister	3	C SE NW 17-19-9 E	2480-2509	10
Evans Bros.	1	NWc SE 31-19-9 E	2480-2487	10M
Kennedy et al.	1	SWc 24-18-11 E	1885-1900	3M
Irelan	3	NWc SE NE 13-17-10 E	1869-1897	75
Ray	6	NEc SE SW 13-17-10 E	2431-2481	35
Future	2	C SE NW 2-16-11 E	2639-2645	25
Wilcox	3	NEc NW SE 18-14-10 E	3393-3411 OWD	600
Sapulpa	1	NEc 19-18-9 E	T.D. 2990	Dry
Hivick et al	1	NWc SW NW 14-18-12 E	T.D. 2212	Dry
Kawfield	1	NEc NW SW 23-16-10 E	T.D. 3454	Dry

Garfield County

Company	Well No.	Location	Depth	Init. Prod.
Knox	6	NEc SE SW NE 26-22-4 W	T.D. 1960	Dry
Knox	7	SWc SW NE 26-22-4 W	T.D. 1825	Dry
Knox	8	NEc SW SW NE 26-22-4 W	T.D. 1775	Dry

Grady County

Company	Well No.	Location	Depth	Init. Prod.
Magnolia	4	SWc NE NW 34-3-5 W	T.D. 3562	Dry
Gant et al	1	SEc NW 17-4-6 W	1814-1824	11M
Marland	1	SEc NE 17-3-5 W	2295-2302	85
Prairie	6	NWc NE NW 21-3-5 W	2138-2156	30

Grant County

Company	Well No.	Location	Depth	Init. Prod.
Kay	1	SWc SE SW 14-27-3 W	4056-4075 OWD	660

Kay County

Company	Well No.	Location	Depth	Init. Prod.
Comar	1	NEc NW SE 31-27-2 E	2460-2465 OWD	49
Prairie	1	NEc NW NW 17-27-1 W	T.D. 3817	Dry
Larutan	4	SEc NE NW 30-27-1 W	T.D. 802	Dry
Anderson et al	1	SWc SE SW 31-27-2 E	T.D. 651	Dry

Muskogee County

Company	Well No.	Location	Depth	Init. Prod.
Parks	1	SWc NW SW SE 24-15-19 E	T.D. 1866	Dry
Sunray	9	NWc SW 5-14-19 E	724-742	40
Sioux	3	CNL NE NW 24-13-18 E	512-540	1M

Okfuskee County

Company	Well No.	Location	Depth	Init. Prod.
Unborn	2	SWc NW 31-10-12 E	T.D. 3055	Dry
Hartman	1	SEc NW NE NE 27-12-11 E	T.D. 2808	Dry

Okmulgee County

Company	Well No.	Location	Depth	Init. Prod.
Tiger Mtn.	1	NEc 19-12-13 E	T.D. 2982	Dry
Harsha et al	2	CSL NE SW 34-16-14 E	1859-1877	10
Mid-Cont. et al	1	NEc SW 10-15-14 E	983-999	40
Pine	1	SEc NW 10-15-14 E	928-994	15
Wallace	3	CSL NW SE 14-14-14 E	986-996	10
McNutt-Davis	1	SWc NE NE 17-13-14 E	1218-1229	2

Osage County

Company	Well No.	Location	Depth	Init. Prod.
I. T. I. O.	372	NEc NW SE 22-27-11 E	1672-1695	25
Brown	1	SWc SE SW 3-26-6 E	2826-2839	37
Kewanee	3	SWc SE NE 3-26-6 E	2776-2830	1212

Pawnee County

Company	Well No.	Location	Depth	Init. Prod.
Magnolia	1	NEc NW 10-22-4 E	T.D. 4745	Dry
Garber	1	SWc NW 9-22-6 E	T.D. 3525	Dry

Pontotoc County

Company	Well No.	Location	Depth	Init. Prod.
Homa Okla.	2	NWc SW NW 16-5-8 E	2460-2509	90

Pottawatomie County

Company	Well No.	Location	Depth	Init. Prod.
Independent et al.	2	NWc SW NW 14-7-4 E	3617-3748	200
Twin State	3	NWc SW SE 19-7-4 E	3715-3765	80
Magnolia	1	SWc 17-7-5 E	4086-4134	48
Magnolia	1	SEc 18-7-5 E	4040-4080	29
Amerada	6	NWc SE SW 4-9-5 E	4299-4345	70
Gypsy	1	SWc SE 8-9-5 E	4453-4462	607
Independent et al.	6	NWc NE NE 8-9-5 E	4368-4387	575
Gypsy	4	NEc SW SW 9-9-5 E	T.D. 4445	Dry

Seminole County

Company	Well No.	Location	Depth	Init. Prod.
Prairie	1	SWc NE NE 3-9-6 E	T.D. 4289	Dry
Continental	1	SWc NW SW 28-10-7 E	T.D. 4660	Dry
Philmack	1	SEc NE NW 1-9-5 E	T.D. 4350	Dry
Magnolia	1	SEc NW 17-8-6 E	T.D. 4427	Dry
Empire	3	SEc NW 23-8-6 E	T.D. 4700	Dry
Gypsy	1	SEc NE SW 35-8-6 E	T.D. 4292	Dry
Slick	1	SEc SW SW 1-6-6 E	T.D. 4156	Dry
Swain	1	SEc 20-6-7 E	T.D. 4558	Dry
Gypsy	1	SWc NW SE 36-8-6 E	4416-4422	1575
Magnolia	3	SEc SW NW 32-8-8 E	4149-4158	70
I. T. I. O.	5	NEc NW NE 1-7-6 E	4202-4210	1379
Tidal	1	SEc NE NW 1-7-6 E	4432-4439	1165
I. T. I. O.	1	NEc SE 2-7-6 E	4375-4381	2275
Independent et al.	4	SWc NE NE 11-9-5 E	4390-4410	1100
Magnolia	7	SWc NW SW 11-9-5 E	4272-4288	2224
Continental	4	NEc SE NW 12-9-5 E	4230-4254	4500
Magnolia	2	SEc SW SW 12-9-5 E	4310-4317	893
Twin State	4	SEc NW NE 12-9-5 E	4237-4248	2695
Amerada	2	NWc NE SE 4-9-6 E	4483-4520	70
Carter	7	SEc NE 4-9-6 E	4514-4533	245
Gypsy	3	SEc SW NE 4-9-6 E	4333-4409	372
I. T. I. O.	1	SWc NE 25-9-6 E	4270-4281	684
I. T. I. O.	2	SEc SW NE 25-9-6 E	4382-4391	182
Carter	1	SEc SW NE 27-9-6 E	4245-4267	135
Sinclair	4	NEc NW SE 10-8-6 E	4005-4142	500
Sinclair	5	NEc NW SW 11-8-6 E	4335-4246	275
Gypsy	4	NEc NW NW 13-8-6 E	4193-4220	920
Gypsy	1	NWc NE NE 13-8-6 E	4375-4377	45M
Tidal	2	NEc NW 13-8-6 E	4320-4334	1215
Tidal	3	NWc NE NW 13-8-6 E	4222-4338	635
Empire	6	NEc NW SW 14-8-6 E	4263-4373	230
I. T. I. O.	2	NEc SW SE 35-8-6 E	4341-4345	1130
Barnsdall	3	SEc NE NE 10-9-5 E	4282-4296	3643
Gypsy	4	SEc NW NE 10-9-5 E	4333-4358	1845
Gypsy	8	NEc SE NW 11-9-5 E	4512-4521	767
Prairie	4	SWc SE NE 23-8-6 E	4220-4229	330

Stephens County

Company	Well No.	Location	Depth	Init. Prod.
Magnolia	1	NEc SW SW 3-1-5 W	3720-3725	6M
Magnolia	1	SEc NE 31-1-5 W	1860-1867	5
Owen-Wood	3	NWc SE NW 12-2-8 W	2070-2079	50
Magnolia	1	NWc NE SE 31-1-5 E	T.D. 2312	Dry
Hivick et al	1	NWc SW NW 14-18-12 E	T.D. 2212	Dry

Tulsa County

Company	Well No.	Location	Depth	Init. Prod.
Sheridan	3	SWc SE NE NE 27-19-11 E	1789-1792	2M

Wagoner County

Company	Well No.	Location	Depth	Init. Prod.
Cartwright et al.	4	CSL SW 11-18-15 E	T.D. 1480	Dry
Rowland et al.	1	SEc SW SE 31-18-15 E	T.D. 1355	Dry
Cane et al.	1	SWc NE 36-17-17 E	T.D. 850	Dry

KANSAS

Butler County

Company	Well No.	Location	Depth	Init. Prod.
Magnolia	4	NWc 34-27-6 E	3053-3062	50

Chase County

Company	Well No.	Location	Depth	Init. Prod.
Preston et al	6	C SW NE 36-18-6 E	T.D. 1248	Dry

Greenwood County

Company	Well No.	Location	Depth	Init. Prod.
Phillips et al	1	SWc NE 35-23-8 E	T.D. 2479	Dry
Smally et al	1	NEc SE NW 7-25-11 E	T.D. 2045	Dry
Empire	3	SEc SW SE 24-22-12 E	1720-1772	50
McGinnis et al	2	NWc SE SW 4-27-11 E	1820-1842	100

McPherson County

Company	Well No.	Location	Depth	Init. Prod.
Laughlin et al	1	SEc 30-21-5 W	T.D. 3540	Dry

Great Western Oil Builds 3-Story Addition

CLEVELAND, Oct. 25.—The Great Western Oil Co., with headquarters here, is building an addition to its main plant here, B. W. Browne, president, announces.

The new warehouse and manufacturing plant is the company's third in Cleveland. Branch plants are at Detroit, Buffalo, Indianapolis and Grand Rapids. The company owns 80 filling stations and controls nearly 300 more.

The new building is three stories high and has 30,000 square feet of floor space. Added efficiency is expected to result from the special design of the building and from the modern equipment. The main stock room is high, with mezzanine floors on two sides. Large tanks of lube oils, kettles, mixers and other apparatus will be placed here. The room will be heated, making the heavy oil easier to handle.

Mr. Browne has been in the oil industry in Cleveland since 1883 when he came here from England and joined Scofield, Shurmer & Teagle Oil Co., which later was absorbed by the Standard Oil Co. John Teagle of this company, was the father of Walter C. Teagle, now president of the Standard Oil Co. of New Jersey.

Drilling Operations in Oklahoma, Kansas and Texas, Week Ended October 22, 1927

	October 22 Loc.	Rigs	Drg.	S.D.	Week Total	October 15 Loc.	Rigs	Drg.	S.D.	Total
OKLAHOMA										
Burbank	1	3	7	9	20	..	2	10	8	20
Other Osage	8	6	14	6	34	2	8	14	4	28
Bristow-Cushing	4	3	29	9	45	3	2	31	8	44
North Oklahoma	14	9	56	43	122	11	7	49	53	120
South Oklahoma	7	11	112	39	169	8	7	110	38	163
Muskogee	..	6	26	19	51	..	6	31	18	55
Okmulgee-Bristow	7	44	46	23	120	8	44	54	19	125
Tonkawa	1	..	2	3	6	1	..	3	2	6
Seminole Dist.	25	21	386	36	468	22	28	412	42	504
Total Oklahoma	67	103	678	187	1,035	55	104	714	192	1,065
KANSAS	25	39	117	64	245	22	41	113	64	240
TEXAS										
Central	..	81	175	134	310	..	89	190	143	422
Panhandle	..	89	72	100	261	..	86	81	98	265
N. Central	..	38	72	32	142	..	44	65	35	144
West	..	130	159	113	402	..	109	169	102	380
Laredo	..	1	25	19	45	..	1	25	19	45
Total Texas	..	339	503	398	1,240	..	329	530	397	1,256
GRAND TOTAL	92	481	1,298	649	2,680	77	474	1,357	653	2,561

Completions in N. E. Central, West, Panhandle and North Texas, Week Ended October 22, 1927

NORTH AND EAST-CENTRAL TEXAS

Anderson County

Company	Well Farm	Location Survey	Depth	Init. Prod.
Humble	1-Russell	Cammon	T.D. 4043	Dry

Brown County

McCurry et al	15-Newton	Swain	1275-1270	5
Humble	3-Gilberth	SA&MG	1301-1315	260
Phillips	4-Newson	Presslar	1326-1344	240
Roxana	8-Smith	SA&MG	1314-1354	6
Roxana	21-Smith	SA&MG	1309-1328	88
Roxana	22-Smith	SA&MG	1307-1326	40
Roxana	24-Smith	SA&MG	1322-1332	91
Sinclair	6-Smith	SA&MG	1326-1333	215
Sinclair	7-Smith	SA&MG	1324-1341	400
Smith	8-Smith	SA&MG	1318-1340	800
Smith	18-Smith	SA&MG	1320-1342	600
Smith	1-Moore	Debord	1275-1289	200
Wheelock	1-Smith	SA&MG	1342-1352	280
Schrivner	1-Truehart	Lamar	1108-1402	10
Bavers et al	3-Cason	Wilson	1500-1525	90
Gilman et al	1-Kilgore	Mitchell	T.D. 1203	Dry

Callahan County

Navarro	5-Bennett	Comal	1631-1643	40
Shaw et al	9-Miller	Comal	1324-1331	8
Conner et al	3-McDermott	Comal	437-456	5

Cherokee County

Humble	2-Reynolds	Durst	T.D. 4648	Dry

Coleman County

Cheney et al	1-Overall	GH&H	1605-1610	50

Eastland County

Lewis et al	2-Johnson	H&TC	1670-1687	1½M
States	3-Sibley	Van Norman	3083-3100	30 & ¾M
Independent	3-Morgan	Leavaca	2900-3004	3
Adams	1-Nix	Stoneham	T.D. 1938	Dry
States	4-Sibley	Van Norman	T.D. 3165	Dry

Jones County

Cole-Hart	1-Hall	McGee	T.D. 2306	Dry

Limestone County

Granfill et al	1-Dugger	Varella	T.D. 2928	Dry
Transcontinental	1-Dugger	Varella	T.D. 2924	Dry
Lewis et al	2-Dugger	Varella	T.D. 2924	Dry

Palo Pinto County

McGinley et al	1-Sheperd	TP	T.D. 1152	Dry
Shaw et al	1-Gilbert	Bolld	T.D. 4065	Dry

Shackleford County

Sinclair	4-Nail	ET	T.D. 4802	Dry
Reynolds	1-Webb	TP	T.D. 1028	Dry
Waddington	1-Diller Bros.	LAL	T.D. 650	Dry

Young County

Hodges et al	1-Parkinson	TE&L	T.D. 2275	Dry

PANHANDLE

Hutchinson County

Company	Well Farm	Location Survey	Depth	Init. Prod.
Williams et al	1-Sanford	E&TC	2755-2858	60
Ralph et al	1-Smith	M&C	2680-2805	75
Diamond	1-Cockrell	BS&F	2085-3139	25

Moore County

Moore	1-Sneed	T&NO	T.D. 3350	15M

NORTH TEXAS

Archer County

Simms et al	2-Perkins	DCSL	1771-1773	43
Burton et al	1-Farmer	N A R	1523-1525	70
Wilson	1-Farmer	N A R	1487-1490	31
Darr	1-Edward	Bruner	T.D. 1505	Dry
Allday	1-Herron	Spivan	T.D. 1004	Dry
Texas	1-Wilhelm	TE&L	T.D. 1502	Dry
Sun Oil	2-Andrews	Rainey	T.D. 1000	Dry
Consolidated	1-Beardon	Riley	T.D. 1101	Dry

Cooke County

Beckner et al	1-Hyman	Smith	T.D. 1803	Dry
Bell	3-Lynch	Scott	T.D. 1403	Dry
Miller	1-Koelzer	Scott	T.D. 1749	Dry
Hedrick Camp	9-Kleiss	Littleton	1692-1714	30

Montague County

Bridwell et al	3-McGaughey	Nichols	1608-1613	60

Wichita County

Texas	330-Waggoner	Meade	T.D. 2077	Dry

Wilbarger County

Consolidated et al	1-Waggoner	H&GN	T.D. 1412	Dry
Waggoner	2-Waggoner	H&TC	2317-2348	40

Young County

Wichita	1-Hamilton	TE&L	T.D. 1100	Dry

WEST TEXAS

Crane County

Gulf Prod.	40-McElroy	CCSD	2785-2909	90
Gulf Prod.	42-McElroy	CCSD	2913-2949	110

Crockett County

Henshaw	1-Murphy	TC	T.D. 1605	Dry

Glasscock County

Landreth	1-Houston	T&P	T.D. 3885	Dry

Howard County

Marland et al	2-Settles	W&NW	1272-1298	400
F. H. E.	1-Roberts	W&NW	1820-1915	4 & 1½M

Pecos County

Roxana	1-Tippett	H&GN	1336-1400	203
Roxana	1-Smith	TC	1537-1564	500
Mid-Kansas et al	2-Smith	Taylor	1255-1374	95
Elmore	1-Holmes	I&GN	T.D. 2010	Dry

Upton County

Hickey	1-Gormley	H&TC	T.D. 2195	Dry

Completions in North Louisiana and Arkansas, Week Ended October 20, 1927

Company	Location	Well	Depth	Yield
Louisiana—Bossier Parish—Cartersville				
Bethany O. & G. Co.	Dodson No. 2	16-23-12	3086	27M gas
Magnolia Pet. Co.	E. C. Dodson No. 1	16-23-12	3085	29M gas
Caddo Parish—Caddo District				
Arkansas Fuel Oil Co.	Huckaby No. 1	14-21-15	3906	150 bbls.
Dixie Oil Co. (Standard of Ind.)	Files & Mabry B-6	14-21-15	3695	5M gas 20M gas
Dixie Oil Co. (Standard of Ind.)	Robertshaw No. 90	14-21-15	3683	10M gas
D. C. Richardson Estate	Youree-Randolph No. 5	13-20-15	2265	300 bbls.
Texas Oil Co.	J. K. Herold No. 9	14-21-15	3642	225 bbls. 5M gas
Cotton Valley—Webster Parish				
Crusader O. & P. Co.	Hope B-18	24-21-10	2508	80 bbls.
Woodley Pet. Co.	Cox B-1	23-21-10	4439	6M gas
Caddo Parish—Shreveport				
Belchic & Laskey	P. Sharpe No. 12	10-18-16	906	10M gas
Waskom—Caddo Parish				
Greenwood Prod. Co.	Agurs No. 3	6-16-16	1085	dry, aband.
Caddo Parish—Howard				
Woodley Pet. Co.	Knight B-3	11-15-12	2471	2M gas

Company	Location	Well	Depth	Yield
Pleasant Hill—Sabine Parish				
Magnolia Pet. Co.	F. C. Rembert No. 1	32-10-12	3240	30 bbls
Morehouse Parish				
Nat. Gas & Prod. Co.	Tensas-Delta No. 9	27-22-4E	2190	5M gas
Ouachita Parish				
Industrial Gas Co.	Sullivan No. 2	5-18-4E	2197	5M gas
Richland Parish				
Gulf Refining Co.	Marshfield No. 3	30-17-6E	2445	25M gas
East Texas—Cass County				
Mid-Kansas O. & G. Co.	Rogers No. 1	Potter HRS	2830	dry, aband.
Waskom—Harrison County				
C. H. Lyons and assoc.	Bryson No. 3	Wilson HRS	1935	6M gas
State Line O. & G. Co.	Isaacs & Hardaman No. 1	E. Little HRS	1945	3M gas
Tylong O. & G. Co.	Abney No. 2	E. Pollack HRS	950	5M gas
Arkansas—Smackover				
W. R. Keever	Ezzell No. 2	12-17-15	2172	40 bbls.
Lion O. & R. Co.	Hays No. 7	4-16-15	2286	150 bbls.

Important Texas Completions

(By Telegraph)

HOUSTON, Oct. 23.—Important completions in Winkler, Gray and Young counties turned attention to Texas operations last week. Cranfill & Reynolds, drilling in Sect. 28, Block B5 Winkler county, got a well at 2,883 feet making 500 barrels an hour. In Sect. 89 Gray county, Gulf Production Co's Bowers extension to the Pampa district was deepened to 3.075 feet, making 3,875 barrels daily. The Gulf well originally made 1500 barrels at 3,003 feet, but declined to 600 barrels daily before deepening. A mile and half northeast of Graham, in Young county, Pitzer and West deepened their No. 1 Hinson, four feet to 2,216 feet, transforming it from a 40 barrel pumper to a 1,000-barrel well.

TULSA, Oct. 24.—The group session of the American Petroleum Institute which will discuss natural gasoline will be held on Dec. 8, it was announced today by A. V. Bourque, secretary of the Association of Natural Gasoline Manufacturers. The gasoline association will be in charge of the program for the group meeting as in previous years.

Yates Field Delimited

(By Telegraph)

HOUSTON, Oct. 24.—Finding of sulphur water at 1,456 feet in the No. 1 Smith test of the Mid-Kansas and Trans-Continental partnership in Sect. 31, Block 194, Pecos county, has delimited Yates field production about a mile south southwest of the discovery well group. The test is more than two miles east and south of the Mazda and Red Bank partnership well on the Smith in Sect. 24, which has been reported from San Angelo as showing sulphur water, but which Friday made 280 barrels of clean oil in 14 hours.

Chemical Research in Petroleum Offers Many Opportunities

By John Morris Weiss and Charles Raymond Downs

Consulting Chemical Engineers, New York City

THE number of chemical products prepared commercially from coal tar hydrocarbons is so numerous that it would require many printed pages even to enumerate them, while the commercial chemicals prepared from petroleum oils are so few as to be almost counted on the fingers of one hand. From a purely chemical standpoint, the development of petroleum products has been almost negligible while every day new coal-tar products make their appearance on the market.

The reason for this is the fact that sufficient basic fundamental work on which such advances can become commercial, has not been carried out in the field of petroleum hydrocarbons. The main urge has been toward the marketing of oils in large bulk. The chemical field, is, however, a fruitful one and the coal tar industry illustrates how industrial applications grow from scientific investments.

As a case in point, a line of attack which has been very rich in commercial results in the field of coal-tar products is that of partial oxidation in the presence of catalysts. Prior to 1916, there was no industry of phthalic anhydride in this country. It was made in Germany by an involved and costly process and was used in comparatively small amounts in the United States—probably not exceeding 300,000 pounds per year. The discovery was then made by H. D. Gibbs, an American chemist, that the coal tar hydrocarbon naphthalene, if oxidized by ordinary air in the presence of certain catalysts, would give phthalic anhydride with large yields.

This process was commercialized and owing to the fact that the only materials required were the relatively cheap naphthalene (tar-camphor) and air, resulted in a domestic production of material at costs which were only a fraction of the previous pre-war cost of the product. This low cost has resulted in the opening up of many new uses for phthalic anhydride so that the production in the United States today is at the rate of 6,000,000 pounds per year and constantly increasing.

One of the large and growing uses of phthalic anhydride is in the manufacture of dibutyl phthalate used in the lacquer industry as a plasticizer. Our recently established vat dye industry rests on the base of phthalic anhydride since its low cost gives it a great advantage as against antracene, the base of the vat dye industry in Germany.

This achievement in the coal tar industry was in the cheapening of a commercial chemical but the same tool—catalytic oxidation—has made commercial a number of other chemical products, maleic acid, fumaric acid and malic acid exist in certain natural products such as fruits and berries and for many years were laboratory curiosities, of theoretical interest only.

No industrial work on them was considered since the cost of preparation was so great that they could not be considered as raw materials for chemical industry. The application of catalytic oxidation to benzol, another coal tar hydrocarbon, caried on by Weiss and Downs, gave these products in high yields so that they are now on the market at cents per pound rather than at the previous dollars per ounce. Malic acid is the natural acid present in apples, pears and many other fruits and the use in beverages as an acidulent for these and other food products has proved as satisfactory as the natural citric and tartar acids usually employed for these purposes. In a new industry—radio—malic acid has proven indispensable as an electrolyte in certain types of trickle chargers, and has reached a very considerable tonnage use for this purpose alone.

BESIDES these direct uses the cheap production of these acids has made possible the synthesis of a large number of other materials such as succinic acid, aspartic acid, thiophen, pyrol and their various products, as well as a number of new dyes so that an entirely new section of synthetic organic chemical production is being built up on the basis of the products of catalytic oxidation of the coal tar hydrocarbons.

The methods used in the coal tar industry are also applicable to petroleum products. Crude petroleums contain a large number of hydrocarbons, all of which can be oxidized to alcohols, aldehydes and acids. Working with only air as the reagent, the production of such materials by a successful process would be very cheap. It is almost certain that some of these products would find valuable uses and hence tonnage markets once they were available in commercial quantities.

The available knowledge of today definitely shows that in all probability the field of catalytic oxidation of petroleum hydrocarbons will be productive. We have available in crude petroleum a large number of groups of hydrocarbons—the saturated paraffins, the ethylene series, the polynaphthenes, all with many individual members.

Work has been carried on oxidizing various crude mixtures with air—during the war certain fats suitable for soap manufacture were so prepared in Germany from paraffin waxes. True, this was only commercial under war conditions, but it is quite reasonable that a process could be developed that would give yields commercial under ordinary conditions—the probability is certainly there.

Other investigators have isolated formaldehyde from oxidation products of hydrocarbons of the petroleum series.

FORMIC acid, acetic acid and butyric acid have also been detected in the products of petroleum oxidation. Many of these would serve as the base of lacquer solvents and plasticizers which, since spray finishes of the Ducco type came into use, are developing enormous tonnage markets. There is also the possibility of imparting anti-knock properties to gasoline by a mild oxidation process cheap enough to be employed on this tonnage product. With this, lacquer solvents, fats, food products, various alcohols, acids and other chemical products, it can be seen that the field has ample possibilities.

The realization of these possibilities merely requires intelligent and adequate development. This assumes an initial study of fractions from various crude oils and the effects of various catalytic substances in oxidizing them. Catalytic effects cannot be predicted in advance of experimental work, nor the exact products which will be obtained from a particular crude.

Research in the field may be likened to drilling an oil well in a district where the geologic and other conditions are most favorable. The first well may be dry but that does not deter further drilling since there is confidence that in the end a real producer will be obtained. The cost of drilling many wells in the field of catalytic oxidation is less than that of an average oil well, while the returns from a succesful chemical product would be far above those of the average well and what is better, permanent.

A real opportunity exists for those far sighted enough to appreciate the real values to be obtained from sane, scientific development in this almost untouched subject. When it is considered that the raw materials in petroleum in the form of gas oil and fuel oil are valued at less than 1 cent per pound, we have chemical raw material of which only substances such as lime, sand, salt and raw coal approach it in cheapness.

Seminole District Must Decline Greatly Before It Ceases to Trouble

By Lawrence E. Smith
N. P. N. STAFF WRITER

TULSA, Oct. 22

FROM the fact that the Seminole district production has been slipping at a fairly rapid rate for a few days, the optimists—who yesterday or the day before were pessimists—have taken their stand on the side of prosperity for early 1928. In these parts there has been no little of hopeful talk for several days.

Undoubtedly there is some indication of a break in the squally weather which has buffeted the industry for the past year, Seminole's high mark cannot be sustained forever and development of the pools now producing is drawing to a close. The break, however, is not definite enough, say those who take into account factors other than the mere decline in the Seminole district, to warrant assumption that crude oil prices will be advanced—or even maintained at their present level.

"I like to be optimistic," said the operating head for this territory of a major Independent company, "but I am on the other side so far as the next six or eight months are concerned. Any thought of an advance in the market is premature and unwarranted. Such talk could do much harm. Drilling has been well restricted over the older parts of the Mid-Continent and it should be held that way. When we have fully gotten down to the place where we use all the oil we can produce, then will be the time to look for new supplies."

That a further recession in daily production in the Seminole district is in order, is certain. Whether it will be sustained over a long period depends entirely upon what happens to several outstanding wildcats and to wells that have been drilled to the top of the sand and there shut down or produced to small capacity, as is the case with several that promise to open new pools. These could be counted on to start drilling campaigns if they are completed for good production were it not for the fact that a change has come upon the operators. The care-free days appear to be no more. A discovery well in the Seminole district now will be offset by another well and not by one well to each 10 acres of the adjoining lease. The reason for the change is that the money isn't on hand to drill everything in sight.

Confining the calculations to the five pools of the Seminole district, the end of their drilling will be in sight in about six weeks. An up-to-the-minute check on the operations within the boundaries of the pools—not counting the tests outside but in the same general district—shows a total of 349. Of this number, 113 are below 4,000 feet and 116 are between 3,500 and 4,000 feet. When these are finished there will be left 120 of those now under way, and from the trend of things not many more should be added in the meantime. New locations in the five fields are rare nowadays. In the entire district there were when the aforementioned check-up was made only 22 locations and 26 rigs.

The wells yet to be completed will, of course, tend to maintain the output at a sizable figure, but not to the extent completions did a few weeks back. Many of the operations are in the Little River field, which is getting quite a run of wells that make maximum production in the hundreds of barrels instead of in the thousands as was the case in Earlsboro, Bowlegs and old Seminole. Little River now has a well average of 1,179 barrels. It is in its flush stage and compares from this standpoint unfavorably with the original Seminole and Earlsboro pools when they were in the ascendancy.

Another factor which will assist in maintaining production, or rather in keeping it from going to the dogs in a hurry, will be the shooting campaign that is coming. Operators have kept their agreement made early in August to hold back on shooting, but from now on the nitroglycerin people will get more business.

Estimates of the district as of the first of 1928 are numerous, but the majority place it between 300,000 and 350,000 barrels. That means a loss of 90,000 barrels from the figure of today to bring it to 350,000 barrels. This will not warrant close analysis for there are a number of things that can happen. A number of the wells to be completed may be dry or they may be big wells. This is particularly true of Earlsboro.

The district reached its peak July 30 with 527,400 barrels from 638 wells. It now has 899 wells (Oct. 15) producing 440,000 barrels. There is the same number of days left in this year as have been since the district reached its peak and the decline in daily production would have to be about the same amount as it has been in the period between peak of production and today—that is, in total barrels, not well averages.

In the following table comparison between the peak—which is not the peak for each field, but for the district—and the present production is made. It is significant that the loss in well averages in the old Seminole field in that period was small. That field had reached the settled stage. The figures follow:

	July 30			Oct. 15		
Field	Wells	Production	Avg. per Well	Wells	Production	Avg. per well
Little River	1	11,610	11,610	34	40,094	1,179
Bowlegs	174	193,511	1,112	258	130,265	505
Earlsboro	111	204,609	1,853	221	171,749	777
Seminole	310	83,778	270	326	69,769	214
Searight	42	33,893	807	60	28,155	469
Totals	638	527,400	827	899	440,032	489

The unpredictable things are where the production in the Little River, Bowlegs and Earlsboro fields will flatten—where the daily well average will begin to stand still in the manner that it has in the old Seminole field and, how many of the wells now drilling will be producers. Any estimate as to the latter would be a rank guess. Half may be failures, or most of them may produce.

Three hundred and sixty wells added to the list of producers since the peak of daily production have enabled the district to stay just over or just under 450,000 barrels. Looking at it from the optimist's point of view, in spite of 360 new wells, the district has lost 90,000 barrels. And, in a 7-day period ended in mid-October, 28 producing wells were completed in spite of which the field declined 13,000 barrels.

THE signs are pointing to a heavy decline by the first of 1928. But, presenting the bear side in order to get both of them in, what of it if the field does fall to 300,000 barrels or thereabouts? A year ago this time of day, cold chills were running up and down the backs of the Mid-Continent industry at the prospect that the Seminole field would exceed 100,000 barrels a day. It was then

nearing the 60,000-barrel mark; Searight had just been discovered; Earlsboro was unknown, as were Bowlegs and Little River. A little later than this some of the best estimators said the field would not go higher than 150,000 barrels.

Now, there is exultation over the idea that the district will fall to 300,000 barrels by New Year's day.

If it is finally left to this writer to cast the deciding vote in the contest between the two schools of thought he will throw in with those who deny that everything will be rosy come January first. The threat of a crude price reduction is not averted by the decline in Seminole.

The action of the Prairie Oil & Gas Co. directors on quarterly dividend Oct. 14 has significance. This is the third time since the dissolution that Prairie has passed a dividend. The first passing of the dividend was in 1914 and the second in 1925. If the heads of this company could see a prompt betterment of conditions, they would have sent out the checks as usual. The company is not hard pressed for cash and if a betterment in earnings were in sight, appropriate action would have been taken as a matter of policy, if other reasons were lacking, for the Prairie is one company that is bullish on the future whenever it has license to be.

The glorious tomorrow is still not in tangible enough form to have the mayor declare a holiday.

Internal Combustion Engine is Faithful Servant to Oil Producer

By Harry Botsford

WHEN the petroleum industry was in its swaddling clothes there did not appear to be any driving need for engineering supervision. Indeed, of the small group of manufacturers serving the industry only a scant handful employed engineers.

The truth of the matter was that, to many manufacturers, the petroleum industry was merely another outlet for their regular line—a supplementary market of minor importance. An outstanding exception to the rule was the manufacturers of internal combustion engines.

From the very start these manufacturers realized that the task of making reliable, economical and long-lasting prime movers capable of handling oil field loads was an engineering job in all essential details. Those manufacturers who utilized the services of the best engineers available have survived and grown and their growth has been in direct proportion to the ability of their engineers to translate their knowledge and skill into a practical mechanical unit that today represents one of the most economical and dependable of all industrial prime movers.

The petroleum industry to no inconsiderable extent had its first taste of what may be accomplished by adequate engineering supervision when it first started to use gas engines as prime movers. The influence of that initial contact cannot be underestimated or ignored.

The introduction of internal combustion engine into the oil fields was not a spontaneous affair by any means. As a matter of fact the producer of those days looked askance at the new-fangled engine. It was a radical departure from the use of steam engines; so radical that they hesitated to give it a fair trial.

"It will tear itself to pieces!" they predicted as they watched the performance of the experimental engines. "It can't!" replied the manufacturers, "because it is engineered in such a manner that it has a quality of reserve ruggedness that will give it unusual endurance."

The producers were skeptical. But the fact remains that the engineers were right; their statement was based on fact, not theory. Indeed so sound was their belief that today there exists record after record of internal combustion engines running under heavy loads far in excess of 15 years from the date they left the factory.

A FEW months ago the writer was permitted to examine the records of one of the major production companies as applied to the performance of their prime movers. They are using more than 500 engines of various types in all phases of oil field work: as prime movers on beam wells, for central power pumping, for pipe line work, for gas-air lift, for drilling. A considerable portion of these engines are well over 18 years of age and yet the daily shutdown time chargeable to engine trouble and repairs was only 5 hours a month. Certainly this record proves the soundness of the engineers' statement that the engines would last.

The manufacturers called the attention of the petroleum fraternity to the fact that the gas engine utilized a natural lease by-product—natural gas. The economy of this appealed to the shrewd business sense of the small group of producers willing to take a chance on the new type of prime movers.

THE Pennsylvania oil fields where all this took place was, to a certain extent an ideal trial ground. The natural production was so small that steam driven engines were proving so burdensome in their operative costs that had it not been for the timely appearance of the gas engine, a very large percentage of the wells faced abandonment as the only solution.

There has never been a great volume or pressure of natural gas in this field and this meant that boiler wood or coal were necessary to create steam.

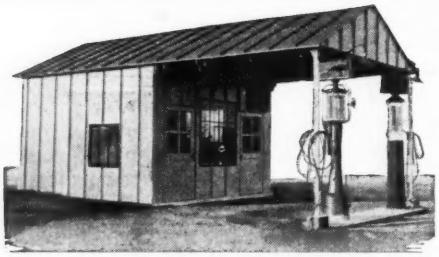
Under these auspices the first slow speed, heavy duty gas engines were put under load. Each particular experiment was watched with close interest by producers.

Gas engine sales increased in direct proportion to the type of service delivered and the economy concerned therein. When the producers saw ample proof of the quality of power delivered, when they noted the continuity of performance, they were prompt in showing their hearty appreciation by buying and using the engines. The performance of these early types of engines proved to the petroleum industry that engineering was a type of supervision that laid down hard and fast rules and specifications that warranted a degree of certainty in the finished product they did not (hitherto) believe possible.

And the grief those early engines went through! Each engine went into the hands of an owner or an operator who knew absolutely nothing of the mechanical and technical principles involved—yet in spite of the handicaps involved, the engines made good. I have examined the records made by some of these earliest types of gas engines and they are astounding in the type of trouble-free service rendered.

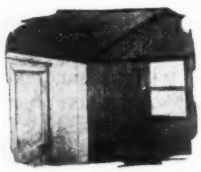
With the coming of the gas engine in the oil fields there came another radical departure: the shackling of a number of wells to a central power driven by a single prime mover. True, prior to the introduction of the gas engine, group driving had been used in isolated instances, but the gas engine stimulated and speeded the process greatly.

Having tasted, so as to speak, the ability and the capacity of the engine makers to live up to their promises and to produce an engineered unit of undeniable dependability, it was perfectly natural for the producers to expect the engine



STEEL-
Filling Stations
Bulk Stations

The BRADEN patented Lock-Joint construction provides the ideal type of steel building for use as filling stations.



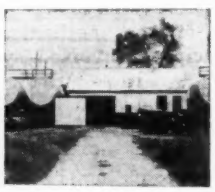
Flat Inside Walls

Note the attractive appearance of our stations. The sheets are flat and are fitted together without bolts by means of the weather-tight lock-joint, which acts as rib or post, insuring rigid walls. Ribs are on the outside, leaving flat inside walls.

Great rust-resistance and durability have been attained by using heavy sheet steel, treating with copper alloy, and then galvanizing.

Weather-tight eaves—fireproof—easy to erect — portable — highest salvage value —all sizes.

Bulk Stations. For use as bulk stations, we offer our well known BRADEN Sectional Steel Buildings. These buildings are also available in types and sizes for all other Oil Industry purposes.



Braden Sectional Steel Building

Ask for fully descriptive literature on our buildings. Also on BRADEN Clamp-Joint Steel Derricks.

BRADEN STEEL & WINCH COMPANY
Tulsa, Okla.

BRADEN BUILDINGS

makers to produce a type of central power that would be as well engineered and as dependable as the prime mover. This was accomplished, and with it the Pennsylvania fields began a steady but hard and fast change to gas engines and group driving and the field flourished because of the economies thus effected.

The application of internal combustion engines to other oil field loads came with the years and each special application is a story in itself in which the best type of engineering produced the ideal unit for each special load.

Take the application of internal combustion power (gas, oil or gasoline) in either single or multiple cylinder engines to drilling and you have an outstanding example of what sound engineering will produce in the way of a drilling engine. Records alone adequately tell the story. I have before me a long list of such records and a few are selected at random:

HERE is a record from Kansas: Using an oil engine one contractor reports drilling 2690 feet of hole in the remarkable time of 26½ days; from Oklahoma comes a verified record of 500 feet of 24-inch hole in one week, this at a daily cost of $2.50 a day for fuel oil; other records equally excellent might be quoted on the performance and economy of gas and gasoline engines of both single and multiple cylinder types as used for drilling.

The point is that internal combustion leadership as a prime mover for drilling and for swabbing is based on its ability to handle the various loads with the utmost dependability—thus proving that their engineering is basically sound and practicable in every respect.

Time was when casinghead gas was purely a by-product that was largely wasted. It was generally known that gasoline was held in suspension by this natural gas but little headway had been made in methods of recovery until 1909 and 1910 when the researches of chemists and engineers employed by makers of internal combustion engines, took the matter under consideration, and by reason of their work transformed the industry from an experimental basis to a commercial one and thus placed in the pockets of oil producers millions of dollars that otherwise would not have been available.

Today the recovery of gasoline by the compression method is one of the most important phases of petroleum income.

Over a decade and a half have passed since the introduction of the compression method of gasoline recovery—yet every important and vital phase of the process represents initiative of the internal combustion industry.

The preponderance of internal combustion prime movers used in gasoline plants not only speaks well for the efficiency and economy of the units but it also speaks well of the safety of such engines.

Naturally the fire hazard is high in such plants and a vagrant spark might instantly cause a disastrous explosion. The requirements of a prime mover for compression plants is exacting and the fact that internal combustion engines are normally used and generally endorsed by oil men and oil field engineers is ample and concrete evidence of their quality.

Gas-air lift as applied to the wells in the greater Seminole area may revolutionize lifting methods; certain, this method is having its capacity tested in this sector. Gas-air lift is still another step-child of the internal combustion engine industry and back of it is a wealth of experimental engineering and co-operative work between producers and the internal combustion engine industry.

The internal combustion engine industry has kept pace with the oil industry throughout the years; there has yet any special condition to arise that has failed to find the engine manufacturers ready with an engineered prime mover to fit that special and specific case.

"Andy" Callaghan Has Silver Anniversary

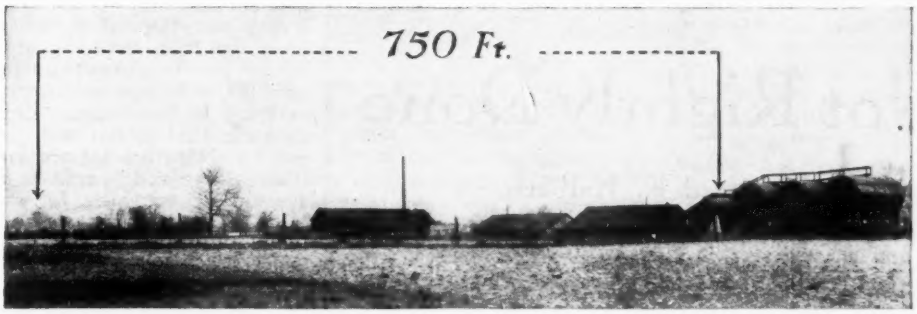
JACKSON, Mich., Oct. 22.—A surprise dinner and felicitations greeted Andrew J. Callaghan, president of the American Oil Corp., and Mrs. Callaghan at the Meadow Lark inn on Oct. 19 when 65 company members, their wives and friends, gathered there to celebrate the silver wedding anniversary on Oct. 22 of the Callaghans.

Since their marriage in 1902, Mr. and Mrs. Callaghan have formed many friendships both in and out of the oil industry. Mr. Callaghan as head of the American Oil Corp. here is widely known in national oil jobbing circles.

As a further tribute of their esteem, the employes presented Mr. Callaghan a silver coffee service, which is said to combine both utility and appearance, according to H. L. Wright, of the company's sales research department.

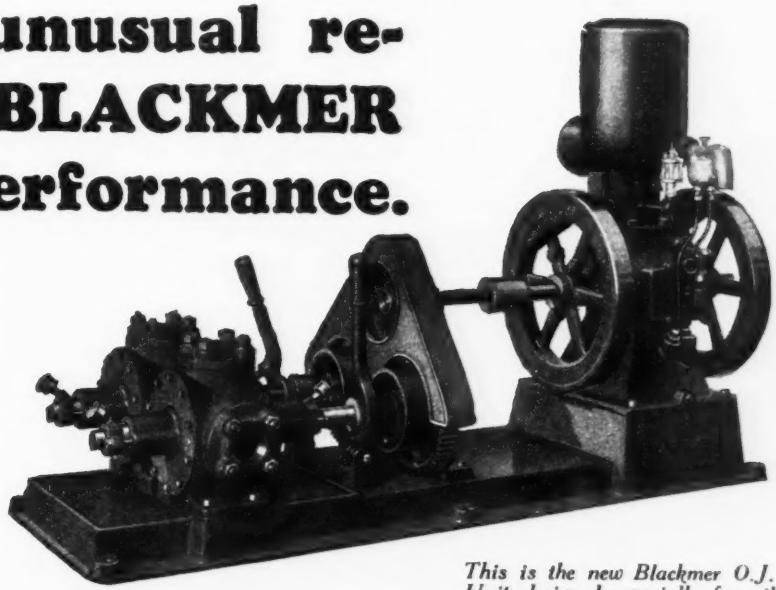
Indiana Truck Corp., Marion, Ind., has secured Ray F. Townsend as assistant to J. W. Stephenson, president. Mr. Townsend has been with the Federal Motor Truck Co., Detroit, for the past several years and prior to that, with the Willys-Overland Co., Toledo. His work has been mostly in sales.

This cut shows a view of the Columbus Oil Co. station at Bucyrus, Ohio, where a Blackmer No. 6S engine driven unit has been in use since July 1921 without repairs or attention of any kind. These pumps draw gasoline overhead from tank car which can be seen at extreme left, a distance of 750 feet. The discharge is 50 feet long with 15 feet elevation.



750 Ft. SUCTION
50 Ft. DISCHARGE
6 Years Service
NO REPAIRS!

A not unusual record of BLACKMER PUMP Performance.



This is the new Blackmer O.J. Unit designed especially for oil jobbers service. Comes equipped with gas engine or electric motor drive, with or without space for firewall. Increased production enables us to sell this unit at a reduced price.

Blackmer Pump Co.
1809 Century Ave.
Grand Rapids, Michigan

Chickens Come Home To Roost if Greasing Is Not Rightly Done

By Ward K. Halbert

N. P. N. STAFF WRITER

The Squeaking Car is Passe

FIND a human discomfort and a remedy for it and a new industry has been born. Back a few years, only the fellow who was a crank about his automobile bothered about squeaking springs and body bolts. He generally spent Sunday morning under his car with a can of grease and a stick.

Now he and his like, and growing numbers of motorists less conscious of a few minor grumbles from their car, spend Sunday morning or Saturday afternoon, as they please. Every so often they, or their wives, take their car to a greasing station where a far better job is done than they ever thought possible. A new industry has been born, catering to that human discomfort of riding in a car that is not well lubricated throughout. Lubrication service is still new enough that owners and operators of such businesses are closely watching for comment and criticism from their customers. This article attempts to give the experience of operators of many stations in Chicago in their relations to the public.

CRITICISMS, whether kind or choleric, are the things every operator of a lubrication station is looking for. They help him form his policy. He makes money in direct relation to his ability to please the public and this entire business of lubricating cars is new enough that there are many kinks to straighten out in the relations of the proprietor of the business with his customers.

The owner of a service station (a complete lubrication establishment) in Chicago recently made the following little speech to his employes.

"There are only two results from a poor greasing job. Either the wronged customer will come back and demand adjustment, which is a bad thing, or he will decide to bear his own loss and not come back at all, which is worse. I only wish I knew all of our dissatisfied customers were telling us about it.

"The average motorist does not know how to grease his own car. He can't tell whether we are giving him a good job, even if he stands by and watches us work. He has to rely on our honesty and prove it by his experience.

"Good greasing will build up a business because there has been a lot of poor greasing done in the past and the customer will not experiment after he finds one place where he can get good work done."

There are many greasing stations in Chicago. A variety of free service is offered with grease jobs here and there, and a maze of prices are quoted. The confusion is due to the fact that Chicago is a city of privately owned oil stations.

Recent figures show that half the stations in town are privately owned, and in most cases the owner works as a salesman on the job. These stations do most of the town's greasing.

Under conditions like this, there are nearly as many business policies as there are greasing stations. Prices are chalked up by Sinclair Refining Co., however, because Sinclair is the only big company in the greasing business as well as the most extensive operator in town.

Greasers in general recognize Sinclair's schedule of prices as official, just as surely as they look to the Standard Oil Co. to name the official tank wagon price. Sinclair's price schedule follows:

Ford, equipped with Alemite	$1.00
Ford, not equipped with Alemite	1 25
All other 4-cylinder passenger cars	1.50
All other cars	2.00
All other cars equipped with grease cups	3.00
Ford springs cleaned and oiled	.25
Springs, all other cars, cleaned and oiled	.75
Special rates on commercial cars, taxicabs and buses.	

EVOLUTION of the private filling station in Chicago has had a direct bearing on the greasing business here. Filling stations multiplied during the months of wide margins in 1922 and for awhile all seemed to prosper. But the multiplication of them so reduced the volume of business for each one that all of them began casting about for side lines to utilize profitably their time and space.

The isolated greasing rack that had already made its appearance on vacant lots about town, automatically became a filling station side line. Some station operators went into car washing. Others put in a line of accessories. Operators who did these things held their identity. The others lost their individuality when the famous Q.D.A. came along.

When it became more profitable for an ordinary filling station to sell only one refiner's products under the Q.D.A. plan, those which had not gone into several lines began to look like company owned stations of Standard, Texas Co., Sinclair or Roxana.

In the meantime the dealers with several lines are developing gradually into "super service stations" of the California type and are making money on greasing service.

There is a marked tendency among Chicago grease service men to eliminate free work. Especially is this true of stations which are in conjunction with automobile laundries. A filling station operator with an inclosed greasing house or a rotary lift on the lot is likely to give any customer's car a free cleaning inside with a vacuum cleaner.

Especially is this true of the operator who gets top prices for his work. But the greasing business in connection with an automobile laundry will not do it. Vacuum cleaning a car is part of the service that the laundry charges for, why should the greaser give it away?

Spring oiling is a matter of considerable controversy in the business just now. Most of the small operators are in favor of the spray. They argue that springs can not be correctly oiled with anything else, and clouds of oil vapor can be seen a block away, rising from almost any out-of-door rack or pit where greasing is done. The men with fancy indoor places are against it. Vapors represent an unknown hazard when confined indoors, and besides they mess up the building.

AN INDEPENDENT operator with an unusually handsome lay-out about three miles west of the Chicago "loop" is equipped to claim both sides of the argument as his own. He has a rotary lift inside of his automobile laundry building, which covers nearly a quarter of a block. To make the place light, the side walls are almost entirely glass and there are no partitions.

Experience proved to this man that oiling springs with a spray soiled the inside of his fine building and sometimes left oil on the clean cars from the wash rack. To overcome it he stretched two wires and hung curtains on them which completely isolate the rotary lift from the laundry. When operating the grease gun the workmen stay in the open but when they start using the spray they draw the curtains to prevent the spread of the vapors.

The section of the floor which may be inclosed with the curtains is covered with fresh sawdust every morning and swept off at the close of business at night.

Sinclair Refining Co. does not use a spring spray at any of its seven "greasing palaces." Springs are oiled with a point brush at Sinclair's palaces as well as some other inclosed places in Chicago. Proponents of the paint brush plan say it is just as effective and just as fast as spraying.

GREASE on the upholstery of an automobile is a thing that will raise the ire of almost any customer. It is easy to avoid in the first place and comparatively easy to remove with a little naphtha if it happens, but that is one of the things that every greaser and every foreman of a greasing crew is charged to watch on his final inspection of cars serviced.

Garage Owners Oil Co., with two elaborate greasing plants in Chicago, has a positive rule against any greaser entering a customer's car for any purpose. Door hinges and locks are given their drop or two of penetrating oil but the oiler stands outside.

The only exception is in the case of a car that has a grease cup or an alemite connection on the inside which can not be reached from below. In such cases the foreman provides the operator with a clean piece of cloth to spread over the front seat, lest he soil it with his fingers. Some operators refrain from oiling door hinges entirely for this reason.

MOST of the kicks made by motorists to greasing establishments fall in two classifications; connections overlooked and connections overcharged with grease. The latter is heard more often. Most of the men in the greasing business are themselves motor mechanics or they take care to employ a man who is, and every car that comes in for a greasing is inspected before it goes out.

A few weeks of experience of an inexperienced greaser are sufficient to familiarize him with all models of automobiles that are in common use. The foreman or the owner of the place, is careful to pay special attention to any peculiar car, a rare make or an old model that has some peculiarities that need watching.

In fact, when a customer brings an unusual machine into a greasing establishment he usually calls the foreman's attention to the hidden grease connections if there are any. Some greasers have manufacturers' charts of the chassis of every automobile in existence. Such manuals can be had without much trouble.

"GREASING by chart is all right," one station owner said recently, "but it is a selling point rather than a mechanical help. Whenever I see a new model of car I get a chassis chart and look it over.

"The sales agency of every new car has charts of this kind. When I have seen one once, that's all I need. If it is not just like the old model I will remember the difference as long as I live. Of course, the chart on the wall gives confidence to the customer and I have used them for that purpose."

Nearly all experienced foremen testify that more kicks result from too much grease than from too little. A great many greasers who work in the pit, drifting from one job to another, know more about automobiles than they do about modern greasing equipment. Air pressure grease guns are great for speed but a green workman often puts too many shots in a place until he gets the knack of a new gun.

A great many popular and medium priced cars have grease connections that must not be overdone. With Ford and Chevrolet cars, especially if they are not in perfect trim, it is possible to force grease onto the brake bands by overcharging the differential. And there are other cars with the same feature.

THE matter of leaving the plug out of the crank case of an automobile or, in the case of a Ford, leaving the lower petcock open, is an experience nearly every man has come in contact with if he has been in the business long. The reason is that it is an irregular matter—not all grease customers want their oil changed at the same time. Being out of the routine, the plug is sometimes forgotten by the workman.

This mistake is fraught with graver consequences than most. "I never permit a customer to take charge of his car at this place after we have greased it until I know the plug is in or the petcock closed," one foreman said. "Many a man has bought a change of oil, lost it through an open petcock and never knew it until his motor was absolutely ruined. It is too expensive a thing to repair. An oil man simply must not permit it to happen."

"More people kick about my $2.50 and $3 charges than anything else they get from me," said a man who operates two filling stations with complete lubrication service at both. "They can get the work done cheaper in the neighborhood than I will do it. I don't know why they keep coming back to me, but I suppose it is what I have told them about my grease. I buy the highest priced grease on the market and use no other. There may be some other kind that is just as good but I am not taking any chances.

It is an established custom among complete lubrication stations in Chicago to guarantee satisfaction. This is an exceedingly broad guarantee and requires a high standard of performance. It probably never would have come about had it not been for the policy of Sinclair Refining Co., which is older than its greasing department. All Sinclair literature carries the slogan, "Your money's worth or your money back." When the greasing palaces were established the policy spread to them and all small competitors had to toe the mark or fall behind.

With a broad guarantee of this sort, the greasing station has been victimized many times by people who want something for nothing. And the large number of customers who have tried to get more than their money's worth has been influential in doing away with the free service.

ONE man tells the story of a customer who bought a greasing job for his car, costing about $3, and then asked the colored boy to wipe off the body with an oily rag. This the boy did, expecting a healthy tip for 10 minutes of the employer's time. But when he had finished he was chagrined to have the customer say, "Now while you have that oily rag in your hand, will you wipe off the heads of my golf sticks too."

Another story is told by a greasing station man who made a practice of cleaning the inside of every car with a vacuum cleaner. Having vacuumed the upholstery neatly, the customer asked to have his windows wiped which was done. Then he requested that the rug be taken out and dusted off. That too was done, and he refused to let the service man replace the rug until he had washed the floor of his war with water. Now the manager makes a charge for every additional service.

Probably the most extreme case on record is a south side greasing station manager, who has been obliged to place a charge of 15 cents per single grease connection. Regular gasoline customers were making a practice of driving over the grease pit with the request that George put a little shot in the two rear shackle bolts. This was usually done with a smile, until a few of the number, having exceptional "crust", began going into the pit and talking the unwary George out of two or three more connections without the management's knowledge. Now single shots are 15 cents.

Gas Lift Measure of Efficiency Is Foot Pounds of Energy

By Paul Wagner
N. P. N. STAFF WRITER

FORT WORTH, Oct. 21

THE measure of efficiency of the gas lift method of oil recovery is the amount of foot pounds of energy per cubic foot of gas, it was pointed out in two papers presented at the Fort Worth midyear meeting of the American Institute of Mining and Metallurgical Engineers, Oct. 19 and 20.

The point was first brought out in a paper of H. R. Pierce and James O. Lewis of Tulsa, who said: "There is much confusion among engineers and operators as to the function of the gas-oil ratio as a cause of efficiency, whereas it is only a measure of efficiency, just like the thermometer is a measure of a change in temperature but does not cause a change in temperature."

It was pointed out that the value of the gas-oil ratio is that it provides a simple and practical means of measuring the sum of the results from the complex relation of many factors underground and in the well, which include the pressure, nature and volume of the gas, the distance the gas and oil have to travel to the hole, the resistance of movement of the oil through the sand by reason of friction, viscosity, adhesiveness to the sand grains, and other factors which consume or waste energy.

Discussing the subject in another exhaustive paper, Professor Lester C. Uren of the University of California and a regular contributor to NATIONAL PETROLEUM NEWS, referred to his support given a wide-spread movement toward "a proper recognition of the significance of the gas factor (oil-gas ratio) as a guide in the control of producing wells."

"IT SEEMS necessary," he said, "in view of the almost elemental faith with which the principle of the gas factor has been received in many quarters, to point out that it is a most complex factor, and one which cannot be regarded as an absolute index of the production efficiency with due regard to other contributing factors by which it is influenced to an important degree.

"The mere recording of a low gas factor obtained through the use of some method or device does not necessarily imply efficient oil production; and conversely, a high gas factor does not always signify inefficient recovery. Other variables also must be taken into consideration and when these are given due weight, it, at times, may be found that the well producing with a relatively high gas factor is the more efficient.

"In comparing the efficiencies of different wells, we are interested not so much in the actual volumes of gas produced with the oil, but rather with the energy consumption represented in the expansion of this gas from the pressure at which it existed in the oil sand. When reduced to the energy basis of comparison, it will often happen, when the efficiencies of two wells are compared, that the one showing the highest gas factor will be producing its oil with a lower unit energy consumption.

"FOR example, suppose that in case No. 1, a well is producing with a gas factor of 1500 cubic feet per barrel from a formation pressure of 250 pounds per square inch; while in No. 2, 1000 cubic feet of gas is produced with each barrel of oil, but the formation pressure is 500 pounds per square inch. Here well No. 2 has the lower gas factor, but is producing its oil with energy consumption of approximately 2.2 times that of No. 1. It is submitted that a more appropriate basis of efficiency comparison would be the product of the gas-factor by the number of times the volume of the gas has increased in expanding from the formation pressure to that at which its volume is measured."

So far as Messrs. Pierce and Lewis could see, they said, "the air-lift has two effects on the efficiency of oil recovery: One, by reason of changes of back pressure against the sand and the other by reason of its effect upon the condition at the bottom of the hole. The last factor is comparatively of less importance, and, therefore, will simply be covered by stating that the gas-lift tends to remove the sand, mud, and other matter from the hole, thus keeping the hole clean. However, it also can be applied as to paraffin up a sand.

"It seems doubtful whether the gas-lift has any important effect on recovery other than the back pressure applied against the face of the sand; therefore, the discussion of the air-lift upon efficiency of oil recovery comes back to the same controversial question as to the use and utility of the back pressures. Without presenting evidence or analytical reasons for their opinions, the writers merely wish to state that they believe that the back pressure will be beneficial or not wholly in accordance with the degree of pressure applied, and the manner of applying it, and in relation to the location conditions.

"When the junior author discussed this subject in bulletin No. 148 of the Bureau of Mines, he called attention to the fact that too high a back pressure would be detrimental, but, on the other hand, there was much evidence that at some point there would be a back pressure for each condition which would be beneficial just as there has been shown to be an optimum submergence for the air-lift with relation to the other concurrent conditions.

"A high back pressure prohibits the full expansion of gas and thus lessens the amount of energy delivered by it. On the other hand, if the gas is allowed to expand to its maximum extent, the additional work delivered will be largely consumed in greater velocity and, therefore, greater friction, so that additional useful work theoretically available will be small. Furthermore, there is good reason to believe that the higher velocities created will result in greater slippage of the gas through the sand and it has been shown by Henry L. Doherty that the taking the gas out of solution from the oil will also have an important and seemingly detrimental effect on the physical properties of the oil.

"THESE lines of evidence are reasoned out by a careful consideration of the results from applying back pressure both under artificial pressure and under natural pressure. The seemingly irreconcilable results reported by various observers of back pressures both when used with air-lifts and elsewhere can be explained by the fact that account must be taken of the limited range in which back pressure can be advantageously used, which if either less or more, will be harmful.

"If the writers are correct in their conclusions, the effect of the air-lift upon oil recovery is to be measured by the back pressure created by it and the air-lift should be designed and operated at a pressure to conform with the back pressure giving the best results in oil recovery.

"These considerations, however, are limited by the practical ones of the competitive conditions at the well and therefore the necessity for getting the highest daily production. Not un-

The Holmes-Manley *Cracking* Process

Flexibility of Operation.

High Yield of Quality Gasoline direct from the Unit.

Fractionation and Condensation under Full Operating Pressure.

High Yield of Liquid Products with a minimum yield of fixed gas and carbon.

Low yield of Residue Fuel Oil of good Quality.

Relatively low Operating Temperatures.

Ease of Control.

Long Runs and High percentage of Operating Time.

Low Labor and Fuel Costs.

Address Inquiries to

THE TEXAS COMPANY

W. S. S. RODGERS

17 Battery Place, New York, N. Y.

Branch Office

816 Palace Building, Tulsa, Okla.

til a great deal more observational data has been collected and analyzed can it be known how to work out the use of back pressures and how to design the air-lift so as to get the back pressures desired, and at the same time have an efficient air-lift within the limits imposed by the size of the casing and other economic and practical conditions.

"It may at first thought seem that the air-lift, which in a deep well may be imposing several hundred pounds of pressure on the well, would create a back pressure instead of lessening the back pressure, but, actually, a naturally flowing well may have a greater back pressure on the sand than is necessary to lift the oil by the air-lift and this is even true with a pumping well. If for any reason the oil coming into the well is not removed as fast as it enters, it heads up in a well and exerts a big back pressure. This will take place if the pump has not sufficient capacity or in a flowing well if the pressure and volume of the gas does not supply enough energy to lift the oil rapidly. Under these conditions the air lift, by removing the accumulated column of oil, will actually reduce the pressure on the sand."

Copyright, 1927, by Underwood & Underwood

JOHN D. ROCKEFELLER

The founder of Standard Oil is waiting to tee off on his private nine-hole course at his Pocantico Hills estate, Westchester county, New York. Mr. Rockefeller is 88 years old and played nine holes to show that he still is physically fit. Shortly after Thanksgiving Day, Mr. Rockefeller will go to his winter home at Ormond, Fla.

MEMBERS at the Fort Worth meeting approved a resolution asking increased appropriations by the federal government for Bureau of Mines experimental work on petroleum industry problems.

John M. Lovejoy, chairman of the petroleum division of the Institute, and a committee to be appointed by him, was empowered to draft a resolution to be sent the secretaries of commerce and interior at Washington, the resolution also asking increased appropriations for geological survey work.

It was announced by J. B. Umpleby of Bradford, Pa., vice chairman in charge of the Fort Worth program, that plans are already being carried forward for the annual meeting in New York, which probably will be held about Feb. 20. It is proposed to bring down to date at that time whatever new information may be possible on air-gas lift practice in oil recovery, but to deal with the subject entirely in terms of new developments.

USE of electricity in oil field operations formed the subject of one session. D. L. Johnson discussed its use in the Mid-Continent; and A. W. Peake and F. O. Prior of the Midwest Refining Co., its use in Wyoming. L. J. Murphy of the Westinghouse company offered a paper entitled "Relative Advantages and Cost of Electric Power in Lease Operation."

Various papers presented at the meeting were published in last week's NATIONAL PETROLEUM NEWS and others appear, in whole or in part, elsewhere in this issue.

THE closing hours of the meeting included an impromptu talk by W. E. Wrather, consulting geologist of Dallas, on Seminole and west Texas production. Mr. Wrather referred to total yields of the Seminole district, as of Sept. 15, last, reaching 97,760,000 barrels, which he estimated at roughly 50 per cent of an ultimate recovery of 200,000,000 barrels from fields currently under development. He felt, Mr. Wrather said, that there is already in sight for west Texas an ultimate yield of between 500,000,000 and 600,000,000 barrels, not allowing for future discoveries.

At the Oct. 19 smoker, President J. D. Collett of the Texas division of the Mid-Continent Oil & Gas Association, referred to the 1924 report of the "Committee of Eleven" of the American Petroleum Institute as probably the turning point of the industry to more scientific methods.

At other times in the sessions clear emphasis was given to the economic influence of the engineer and his "arrival," or recognition, as a group, in petroleum affairs.

The formal organization was effected of a Fort Worth section of the petroleum division, which had been already authorized and charter granted.

E. O. Bennett, chief production engineer of Marland Oil Co. of Texas, was named chairman of the Fort Worth section; Cresap P. Watson, president, Federal Royalties Co., Inc., vice chairman; A. Behnke, Amerada Petroleum Corp., secretary; and David Donoghue, director of Texas Pacific Coal & Oil Co., treasurer.

Mr. Bennett was nominated by W. V. Vietti, seconded by Mr. Watson. Mr. Watson was nominated by Mr. Behnke, seconded by Mr. Vietti. Mr. Behnke was nominated by Mr. Watson, seconded by Paul Wagner. Mr. Donoghue was nominated by Mr. Wagner, seconded by Mr. Behnke.

BARRELS—When You Need Them

Second only to the quality of the barrel is the manufacturers ability to meet your delivery requirements. An unreliable source of supply may cause you the loss of valuable accounts. And hand to mouth buying has served to increase this hazard.

From P. I. W. you will get quality barrels beyond doubt, and you will get them when they are needed, for P. I. W. barrel production is geared to the new delivery demands.

When you place your next barrel contract consider the ability of the manufacturer to meet your emergency delivery requirements.

Branch Plant—Beaumont, Texas

P.I.W.
PRESSED STEEL PRODUCTS

AGENTS

Boston, Mass.	74 West Second St., N. S. Wilson & Sons, Inc.
Detroit, Mich.	222 West Larned St., C. R. Harvey
Wilmington, Del.	4052 Du Pont Bldg., John Keesey
Philadelphia	7005 York Road, Geo. W. Bakeoven
Cincinnati, Ohio	224½ East Fourth Street, J. A. Bauer
Buffalo, N. Y.	1579 Niagara St., John Carey

THE
PETROLEUM IRON WORKS COMPANY
SHARON, PA.

NEW YORK
CHICAGO
HOUSTON
TULSA

"I Helped to Drill The Second Oil Well In the United States"

By John C. Blood
Conneaut, Ohio

BY YOUR request and wish for me to attend your oil congress at Tulsa if possible, or if not write you giving my age, birth, and first experiences in the oil business and as a pioneer in this great enterprise. First I will say that I was born on the Blood farm on Oil Creek, Venango county, Pa., June 16, 1844, and helped drill the second oil well in the United States.

My oil experience dates still further back for I, with my little brothers, from childhood would go down to the creek in the summer time when the water was low and dig little holes in a sand bar where surface oil made its appearance. These little holes were dug down into water. Then the oil would come up on the surface of the water. Then we would spread pieces of flannel cloth on the oil and the oil would soak into the flannel. We would wring the oil out of the flannel into a pan. We had a good business as beginners in the oil business, as we would gather about a barrel of oil during each summer season and in the fall we would sell our oil to a man by the name of Wright at 80 cents per gallon. This oil was called "Seneca" oil and sold as medicine, and was known as such, named after the tribe of Indians that inhabited Oil Creek valley. When the oil was found by drilling wells the name was changed to petroleum.

This brief reference is given to show when I commenced to operate in the production of oil in Pennsylvania. I believe I am the only man living that can date back to childhood as a producer of petroleum.

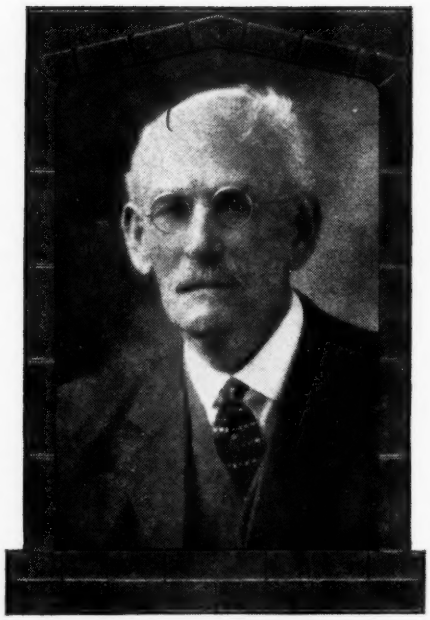
I will give you an accurate statement of the first movement made in leasing farms for oil purposes, which was done by Jonathan Watson of Titusville, Pa., the very day Drake struck oil on the Watson Flats. Watson foresaw into the conditions, and what was possible in sudden action in leasing the farms on Oil Creek where the surface oil appeared he did the same day Drake struck oil. He first leased the Wash McClintock farm where Petroleum Center was built. Next he leased the Blood farm. This belonged to my father. It consisted of 400 acres. And then he leased the John Rynd farm. Next the Rynd Irving adjoining Blood farm. Then he skipped two farms and leased the Hamilton McClintock farm, all done in one day. No one knew of Drake striking oil down the creek until the next day Watson stole a march on these farmers and leased their farms at one-eighth royalty. But they kicked up such a row that Watson had to change the royalty to one-fourth. Watson at once sub-leased these four farms at one-half royalty, retaining one-fourth free.

The company that got the sub-lease was represented by a Mr. James Kear of Pittsburgh, who came on to these farms as superintendent and he made contracts with different parties to drill one test well on each of these four farms. Kear wanted father to take a contract but father said "no, but if you will give my two boys the contract to put down a well, I would help the boys along." So Kear gave the contract to my brother Hiram and me, and we went to work at once building the rig. My father was a good carpenter and very ingenious, so we went into the woods and cut down trees 45 feet long. Father hewed them to eight inches square, then he mortised the uprights to insert the girts and braces. The derrick was 16 feet at base and four feet at top.

NOW this derrick was all put together lying down flat on the ground. When completed we got a dozen men to come and help raise the derrick and set it vertical. This we did by tackle blocks hooked to the top of a large tree. Rope was brought down to snatch block at base, then with team of horses hitched thereto up she went, and with guy ropes derrick was set upright in good condition.

This well was started drilling in October, 1859, by spring poles, and was down about 300 feet, at which point the rock got so hard and our tools were so light we could not make more than about three feet a day. Then Mr. Kear sent us an engine from Pittsburgh up along the Allegheny to Oil City. I, with father and Kear, hauled it from Oil City to the farm. This was the first engine ever hauled to an oil well. It was an old Faber pattern. The boiler had no dome and no steam gage. The safety valve was fastened to the top of the boiler by a flange. The way we tested the pressure of steam was by the pet cocks. I was engineer and driller.

We got the well down the first



J. C. BLOOD

Like the veterans of the Civil War, whose contemporaries they are, the ranks of the pioneers of petroleum—those who engaged in the founding of the industry in the early '60s—are thinning rapidly. First hand accounts of the birth of the industry are now rarities.

Early this year, the International Petroleum Exposition sent out word that it would confer recognition upon the oil man who had engaged in the business for the greatest number of consecutive years. Later it was found that John D. Rockefeller, Sr., desired to be the donor of a gold medal to the one who merited the title. The award was made to J. A. Stephenson, of Tulsa.

About 40 "old timers" submitted their names to the exposition and 15 of them were present when the award was made. Many others were too feeble to come, still others, active in the oil industry today, were detained by business. All submitted sketches of their careers, some detailed narratives, some terse biography.

Among the narratives was that of John C. Blood, now living in retirement at Conneaut, O. Mr. Blood says he helped drill the second well drilled for oil in the United States—the first was the Drake well.

Other bits of history, contained in the accounts written by the early day oil men, will be published in succeeding issues of NATIONAL PETROLEUM NEWS.—Editor.

of February and cased the well with copper chamber, as it was called, with flax seed packer or leather bag. We started to pump with sucker rods and valves in this chamber. In a little while the well began to flow oil and did produce about 100 barrels. Now this was the first well after the Drake well. Second wells were finished in March on the Wash McClintock farm. This well began to flow when oil was struck, caught fire from the forge which was in the derrick. The explosion knocked one man up through derrick, burning him up. The other man was blown about 100 feet out in Oil Creek. The water extinguished the fire in his clothes but he was so badly burned he died.

The third well was drilled on the Rynd farm and was finished in midsummer, 1860. At this time there were so many wells being drilled that I don't know just how they came in.

THE first large flowing well was on the John Buckanan farm. This well was owned by a Mr. Rouse, who, with several hundred men, had gathered in and around the derrick watching the well flowing, when all at once the gas ignited and the explosion knocked everyone down. There were 137 men badly burned. Rouse and about 90 were burned to death. This well flowed about 500 barrels per day after the fire was quenched.

The largest flowing well was on the Him Tarr farm adjoining the Blood farm. This well flowed 4,200 barrels of oil and was owned by Phillips Brothers of Pittsburgh. The next largest well was on the Blood farm. This well flowed 3,600 barrels per day. There were many wells being brought in on the Blood farm and the other farms in the year 1860 and 1861.

All wells were drilled on bottom land in the valley. No wells were on the hills for the reason that all oil men thought the oil deposit was confined to the valley and did not exist under the hills. And this opinion was held until 1867 when two men by names of Elick Moss and Calo Green got a lease of two lots one-half acre each, about half-way up Blood hill. They were making a test to ascertain whether there was any oil under the hills, and at the depth of 780 feet they struck into oil in the oil sand. This well was the first oil well drilled on the Oil Creek hills, and was the means of opening the eyes of all oil men operating in Pennsylvania, and showed them that this oil was confined in an oil belt having a trend to the southeast, running under valleys and hills. The average depth of the wells in the valley was about 500 feet and became deeper according to elevation. I got a lease on top of the hill and put down a well and struck the oil sand at a depth of 1,000 feet. I got a good well. The average production per well was about 150 barrels oil and at this time was selling at $8 per barrel.

I made a study of the formation of the rock stratum pertaining to this great oil belt. I found that the out crop of the sand rock was at a little town called Hydetown, seven miles north of Titusville. At this point the sand rock was quarried out to use as building stone. Seven miles below the Drake well was about 200 feet to sand rock. Ten miles down Oil Creek the oil sand was about 500 feet, starting at Titusville, Crawford county, this belt passed on through Venango county, Clarion county, Butler county, Armstrong, and on into Washington county. Test to the mile the depth of this oil sand was about 15 to 20 feet, 20 to 40 feet in thickness.

Now gentlemen, I will not intrude any further on your honorable body of oil men. I have just given you a crude explanation of conditions as they existed in the early days of the oil business. And so far as my own operations I operated on the Blood farm up to 1873, when the panic struck the oil business I sold out and went to Colorado for my health. Was there two years then came back, and in 1876 went into the oil field in Lorain county, Ohio. I put in Standard Oil rigs and leased farms, and put down 56 wells in that field. My best wells did about 185 barrels per day. I was operating there for nine years, then I sold out my wells and went back to Colorado (20 miles from Denver).

And in 1889 I leased 7,000 acres of land and got up a company and listed part of our stock in the mining exchange. Raised $50,000, bought first class heavy machinery and heavy tools. I hired four of the best well men and drilled the largest diameter hole ever drilled up to that time. The hole was 16 inches in first casing. This ran down 900 feet. Caving of formation caused casing at four different points in drilling 2400 feet. At this point I resigned as manager and superintendent. The company put another man in charge and he lost a string of tools in the hole and the well was abandoned.

OWING to poor health I went to Idaho, looking up an oil possibility at lower end of Snake River valley. I found asphaltum out cropping and Gordon sand rock on the foot hills, which interested me. I started in leasing farms and aimed to control the entire district. I spent two years and obtained 42,000 acres of land. I had interested business men and oil men to put up capital with me, and when I was ready to do business they fell down. Then I dropped the prospect and turned the leases over to a home company. They drilled a well 4200 feet and did not get through the lake sediment. The well was down 2000 feet below sea level and abandoned at this point.

Finally I have moved back to Ohio, retired from all business and am living a quiet life in my old age. My health is good. I am nearly blind and hard of hearing, but am resigned to conditions and still hope to live to the one hundred mark.

Gulf Coastal Water Shipments, September Compared with August

(All figures in barrels of 42 gallons)

Company—Port	Coastwise August	Refined September	Export August	Refined September
Standard of Louisiana, Baton Rouge	982,395.00	985,368.00	831,899.00	1,168,319.00
The Texas Company, Port Arthur	1,438,431.00	1,177,984.00	301,402.00	592,951.00
Gulf Refining Co., Port Arthur	2,928,479.03	2,678,151.38	136,339.22	108,076.67
Magnolia Petroleum Co., Beaumont	1,176,451.69	851,421.09(a)	.....	.....
Sinclair Refining Co., Houston	445,935.82	233,278.15	79,789.22	21,931.00
Humble Oil & Refg. Co., Baytown	1,832,304.71	1,509,950.31	1,243,681.65	1,055,377.13
Marland Oil Company, Texas City	.....	.....(b)	.....	.....
Atlantic Oil Producing Co., Atreco	104,914.15	95,075.63	.....	.....
Galena Signal Oil Company, Houston	40,000.00	.....	28,000.00	56,000.00
Deepwater Oil Refineries, Houston	.....	.....	.....	.....
Keen & Woolf Oil Co., Houston	.....	.....	.....	.....
Pure Oil Company, Smiths Bluff	285,611.39	519,073.54	.....	.....
Totals	9,234,522.79	8,050,302.10	2,621,111.09	3,002,654.80

	Coastwise	Crude	Export	Crude
Standard of Louisiana, Baton Rouge	61,295.00	350,778.00	65,374.00	70,748.00
The Texas Company, Port Arthur	.....	.....	.....	.....
Gulf Refining Co., Port Arthur	.....	.....	.....	.....
Magnolia Petroleum Co., Beaumont	797,833.58	763,432.65(a)	.....	.....
Sinclair Refining Co., Houston	439,422.08	306,505.99	.....	.....
Humble Oil & Refg. Company				
Texas City	1,894,023.00	1,414,496.00	.....	91,605.00
Baytown	1,081,530.00	923,082.00	.....	78,673.00
Ingleside	15,591.00	507,566.00	.....	.....
Neches Terminal	133,780.00	90,678.00	.....	.....
Atlantic Oil Producing Company				
Atreco	221,166.88	360,492.63	.....	.....
Pasadena	44,835.45	78,193.12(c)	.....	.....
Beaumont	381,935.30	386,899.15	.....	.....
Smiths Bluff	.....	76,771.61	.....	.....
Swiftsure Petroleum Co., Texas City	136,538.00	58,281.00	.....	.....
Pure Oil Company, Smiths Bluff	654,220.66	749,801.78	.....	.....
Sun Oil Company, Sabine Pass	.....	676,603.00	.....	.....
Totals	5,862,170.95	6,743,580.93	65,374.00	241,026.00

(a)—Magnolia Petroleum Company makes no distinction in reports between coastwise and export shipments.
(b)—No report.
(c)—Handled through terminal of Crown Central Petroleum Corp.

Joint Ownership of Wildcat Blocks Favorable to Field Efficiencies

By Paul Wagner
N. P. N. STAFF WRITER

HOUSTON, Oct. 24

PERCENTAGE ownerships of prospective oil lands, first publicly discussed as an exploratory policy in NATIONAL PETROLEUM NEWS, represent a way of applying to diversified acreage holdings the principle of developing entire producing fields under a single management.

Students of the plan see nothing in state or federal law to prevent the consolidation of wildcat acreage into drilling blocks under a single management for the testing of oil possibilities; and some of them propose trying the fractional ownership plan when conditions in the industry return to a status under which the companies begin buying wildcat leaseholds again.

Operating responsibilities under the plan would be vested either in a board composed of representatives of the several companies pooling their acreage for testing or by mutual agreement, in the company owning the largest percentage interest. In the case of a promoted drilling block the result would be identical, the only difference being that subscribing companies would purchase percentages instead of pooling their acreage and taking out fractional interests of the whole.

The plan, when worked out in the wildcatting stage of oil development, would appear legally to represent a joint effort of a group partnership to discover, preliminary to development, oil fields that previously were suspected but not actually known to exist.

THERE could be no charge made in law that the group partnership was formed to restrict production, transportation or marketing of crude, since percentage plan participation would function as a concerted pooling of interests working constructively toward the end of finding new sources of crude for development.

The question arises in some states, notably Texas, as to whether percentage operations could be legally worked out for future development after a field discovery actually had been made. No legal inhibition would apply, however, against outright purchases of properties intended to bring oil fields under single, or fewer, ownerships.

Percentage pooling of leaseholds after a field had been proved to exist might be construed from the legal viewpoint as a restrictive influence on production, notwithstanding that acreage consolidations of this sort contemplate each participating company retaining a call on its share of the oil, if desired, for its own pipeline and refinery use.

A discovery made by a group partnership, on the other hand, would have in its favor the legal status of its owners contemplating development in line with leasehold requirements and economic needs; though competitive operations of the sort forced by drainage conditions in underground reservoirs would not be found necessary.

AS PREVIOUSLY pointed out in this periodical, it would be impossible under the fractional ownership system to space wells according to maximum engineering efficiency, as shown by structural and other data brought to light in field development. Wells would not need to be drilled against property lines, but could be located in the center of each development unit of 10, 20, 40 or 80 acres indicated to permit most advantageous recovery under the structural conditions peculiar to the individual field.

Fee land and royalty owners would be protected against drainage under the practice mentioned and it would be possible in the early stage of development to drill a well for each of them while feeling out the size and character of the underground structure. Conservation of gas in the stratum where found and its utilization as a natural force for the propulsion of petroleum under the most advantageous conditions would also result in retention of field pressure and longer flowing lives of wells.

Under the present system of lease ownership, it has been pointed out by John M. Lovejoy, chairman of the petroleum section of the American Institute of Mining & Metallurgical engineers and vice president of the Amerada Petroleum Corp., at Tulsa, the industry is helpless after a field is once opened; as "we must protect our properties against drainage."

The idea of this (percentage) type of unit, or partnership, operation is not new, he said; although the writer here wishes to make plain that such fractional ownerships had never been proposed as a general industrial policy until suggested to the Federal Oil Conservation Board at Washington and the Railroad Commission of Texas in a hearing on Judge H. E. Bell's proposal of a new state conservation law.

Mr. Lovejoy, in referring to field work previously done in this connection mentioned blocks drilled in the Mid-Continent, particularly in areas where companies had expiring leases but where no one company had sufficient acreage to justify drilling themselves.

Somewhat similar practice has prevailed in various parts of the country to the extent of such partnerships as those in effect at Rainbow Bend, Kan., Big Lake, Texas, and Lockport, La. They are not identified as fractional ownerships and the machineries of the respective operators are different from the percentage plan; yet from the viewpoint of practical results these ownerships are not materially different.

At Rainbow Bend, the Independent Oil & Gas Co., the Waite Phillips Co. (now Barnsdall Oil Co.) and the Marland interests owned quarter and half interests in the field under the operating management of the Waite Phillips Co. The Big Lake field is owned by two operating interests, the Big Lake Oil Co., and the Texon-Group 1 companies; however, in this case the Texon-Group 1 interests own 25 per cent of the stock of the Big Lake Co., both operating independently the acreage owned in the individual case. In the Lockport field, the Vacuum Oil Co., as 75 per cent owner operates the property and charges back to the Gulf Production Co., its 25 per cent of development and equipment expense.

THE foregoing examples of joint ownerships are generally thought of in the industry as partnership operations, but they are really no different in their essentials than percentage developments except that the last mentioned would be ordinarily extended to include groups of companies rather than partnerships in the usual sense of the word.

The nearest approach to the proposal percentage plan actually functioning is in the Boggy Creek area of east Texas, where Humble Oil & Refining Co., and Rio Bravo Oil Co., subsidiary of the Southern Pacific railroad, own a block on which a discovery well was drilled[5] by the Humble last March.

About 4000 acres calculated to include the top and flanks of an interior Texas salt dome at Boggy Creek were

Letters To The Editor

National Petroleum News

On Motor Oil Situation

Editor, National Petroleum News.
Dear Sir:

I WAS much interested in Mr. Truesdell's article on the new lubrication problems caused by high speed automobile driving (page 17 Oct. 12 issue N. P. N.) I believe, however, that while Mr. Truesdell has drawn a true picture of the situation, the remedy lies in the hands of the automobile engineers much more than in those of the refiner. The principal reason why high speed driving is harder on lubrication is that piston and bearing temperatures are considerably increased, the mean crankcase temperature is increased and, in a majority of cases, no precautions have been taken to compensate for the increased amount of cooling duty that the oil has to perform in addition to that of lubrication.

Most automobiles of the better class, and many of the cheaper cars, now have controlled water temperatures with some automatic arrangement which reduces the warming up period to a minimum and, therefore, maintains the cylinder jacket water within fairly narrow limits of temperature whatever the driving condition. A similar system is extremely desirable for oil, and where a sensible proportion of the engine cooling is done by oil it is quite reasonable to ask for consideration to be given to oil cooling.

The use of heavy oil is always desirable, not because the piston and principal bearings require very high viscosity but because all the small parts in the valve gear and accessory drives, from which nearly all engine noise arises, operate much more quietly and smoothly.

MOST of these parts are lubricated with oil at crankcase temperature, the piston at a temperature which will average 60 degrees above crankcase, and the bearings at temperature which may rise as high as those of the pistons. It is not desirable to have too high a high temperature viscosity from the view point of the pistons because in order to avoid piston slap clearances are now usually so small that theoretically there is no piston clearance whatsoever at temperatures between 200 and 230 degrees. In this connection it is interesting to remember that the viscosity at 210 degrees desired for aviation oils has decreased.

The modern engines, producing much more power and made more accurately, are nearly all designed for a viscosity between 90 and 100 seconds at 210 degres, whereas the older engines consumed an excessive amount of oil if the viscosity at 210 degrees was less than 120 seconds, and oils up to 150 seconds at 210 degrees have been extensively used. It must be remembered that the cylinder oil film is renewed at every revolution, so that rapid spreading is extremely important, also the actual piston and cylinder pressures are not high.

Engines with direct cylinder feeds can be operated under very heavy loads continuously with an extremely small amount of oil, and it is perhaps worth commenting on the fact that the Rolls Royce has for many years been fitted with direct oil feed to each cylinder, a line being connected to the main oiling system through a control valve hooked up with the accelerator. Probably until quite recently Rolls Royce cars were driven at much higher speeds than the majority of machines, and that they are extremely durable is an accepted fact. It is my personal belief that this cylinder oiling has had a good deal to do with the case.

At the other end of the scale the use of heavy lubricants has been retarded by the inability of oiling systems to function at low temperatures. It is perfectly possible to design a lubricating system which will feed oil of almost any viscosity in quantities adequate to prevent injury. Several solutions of the problem have been worked out, most of them involving some kind of a supplementary feed which allows jets of oil to squirt into the cylinders when the viscosity is above some predetermined amount.

Some such device would give the advantage that an engine could safely be fully loaded immediately after starting it, and a heavy oil could be used all year around.

Of course, another restriction to the use of heavy oils has been their carbon-forming tendency. Many cars can use a very heavy oil when driven at high speed but will carbon up rapidly if used for short distances or for city driving. This is essentially a problem that belongs to the refiner, and the recent discovery of how to make very heavy, distilled oils makes possible the use of much more viscous lubricants.

It is also an interesting fact that a very heavy, distilled oil, when used as the heavy stock for blending, produces finished motor oils that are remarkably low in consumption characteristics. Largely for this reason I disagree with Mr. Truesdell on one implied point in his article and this is that the flash point cannot be taken as a direct index of volatility.

OIL consumption can be predicted to some extent from the knowledge of the distillation curves of the constituent oils, but neither the flash points of the blend nor of the constituents of the blend will give a reliable indication. Probably the explanation is that some oils of high flash very rapidly crack and produce volatile material, wheras other oils of the same or lower flash have better resistance to cracking.

I feel that the situation regarding motor oils is somewhat similar to that regarding gasolines. The petroleum industry had fuels ready for high compression engines before any suitable engines were being manufactured. The industry today can supply heavy oils which, from the carbon and gum forming viewpoint, are an enormous advance on anything obtainable a few years ago. The use of these heavy oils, which mean smoother and quieter engines, depends upon the automotive engineers overhauling their oiling systems and devising means to take care of the starting and low temperature condition.

(Signed)
—A. LUDLOW CLAYDEN
Research Engineer
Sun Oil Co.

---

consolidated for development by the Humble and Rio Bravo companies in the proportion of 17.2 per cent belonging to the Rio Bravo and the remainder to the Humble, with the last mentioned company operating. The Rio Bravo retained several small leaseholds, totalling less than 200 acres, in what now appears to be possible producing territory, and the Humble owns individually many thousands of acres surrounding the consolidated properties.

Official proposal of the percentage plan at Washington by Presidents Walter C. Teagle of the Standard Oil Co. of New Jersey and W. S. Farish of Humble Oil & Refining Co., was followed later by decision that any possible legislative steps would necessitate state rather than federal action.

The belief exists that consolidation of wildcat blocks for exploratory testing has no legal inhibitions against it, as herein set forth, and the statement has been made to the writer that at least some of the larger operators propose trying out the plan when the oil industry returns to conditions under which the companies are again buying wildcat acreage. For the present, virtually no additional leaseholds are being bought by any of the larger companies, due to economic conditions brought on by the 1927 production situation and the weakened price structure.

"Scientific Marketing Research Needed" Says Buchanan

RANGER, Tex., Oct. 22

"I FIRMLY believe the petroleum industry is today face to face with the necessity for inaugurating a scientific research program dedicated to the development of new markets and the enlargement of present markets, and that such a movement must concern itself with every known product of petroleum from the lightest gases down to asphalt and coke."

Thus spoke D. E. Buchanan, vice president, Chestnut & Smith Corp., at the celebration of the 10th anniversary of the discovery of the Ranger oil field. Mr. Buchanan went on to say, in part:

"We must admit that the petroleum industry has had its market handed to it on a silver platter. In fact, we might say our market for gasoline has been forced upon us.

"With the possible exception of the lubricating field, we have as an industry, done practically nothing to develop outlets for our products. Surely, in no other industry, of like magnitude is there such an obvious lack of merchandising policy.

"I submit for your consideration this thought: That until we have developed every bona fide, conservative use to which petroleum products can be adapted and have supplied the demand thereby created, we are not justified in locking up the supply. This generation is entitled to the fullest possible benefit from the natural resources of this generation. But I must admit in the same breath that since we have done so little in developing useful application, we must surely need more orderly production today.

"Every individual or company interested in the petroleum industry could well afford to contribute to a research program designed to develop new and additional markets and if everyone did contribute, the pro rata cost would be exceedingly small. No one man, no one company, be the scope of its operations ever so wide, can do the job alone. It is a task for the whole industry working through a collective effort representing every branch and therefore every product of our manufacture. It cannot be done in a day but a small fraction of the losses sustained by this industry this year through overproduction and lack of a marketing policy, had it been directed toward the development of entirely new markets, would surely have brought some results of lasting benefit.

"The present scientific research program of the American Petroleum Institute is most commendable but its scope is not wide enough. The results obtained will be to teach us how better to find deposits of petroleum and how to manufacture them into finished products more efficiently and with less expense. This is all very fine if we know what to do with the products when we get them.

"It is said that there are in use today approximately 700,000 oil burners in homes and that these burners will consume something like 45,000,000 barrels of distillate this coming season. I believe had the petroleum industry as a whole supported the burner industry two or three years ago there would be twice as many burners now in service. This outlet for 45,000,000 barrels of petroleum this year developed in spite of us. We did our best to frighten it away.

"We practically turned a cold shoulder because we were afraid of a shortage of petroleum and consequent higher prices later on. Had the automotive industry followed our line of reasoning they should have discontinued manufacturing motor cars two or three times in the past 10 years."

Bronze Tablet Unveiled at Ranger Discovery Well

RANGER, Oct. 22

RANGER'S homecoming, yesterday and today, commemorated the tenth anniversary of the discovery of oil in Eastland county, Oct. 21, 1917, by the Texas Pacific Coal & Oil Co. A feature of the homecoming celebration was the unveiling of a bronze tablet at the site of the McCleskey discovery well, just outside the town of Ranger.

The keynote of the gathering was expressed by Mayor John Thurman in an opening day address from the balcony of the Gholson hotel when he exhorted his hearers, "Don't Be a Stranger in Ranger." The crowd quickly made themselves at home, living over the early days of the Ranger boom, and making new acquaintances; giving the gathering generally the air of what it was intended to be—a real homecoming.

Members of the oil and gas division of the West Texas Chamber of Commerce took occasion to hold a meeting in connection with the celebration, at which time they pledged assistance to owners of thousands of acres of land to which mineral fee title is being attacked by the state of Texas. Most of this land is in parts of west Texas, including part of the Yates field, Pecos county. In the pending Yates suit, attack has been made on constitutionality of the so-called "relinquishment" act of 1913, whereby lands belonging to the state and classified as mineral bearing could be sold to fee acreage buyers. In this sale the state retained one-sixteenth of the minerals as royalty and the fee land owner was constituted the agent of the state for securing development, getting the other one-sixteenth royalty and whatever bonus he could.

After development of the Yates pool more than a year ago, the state sued not only for return of the one-sixteenth royalty interest of Ira G. Yates under part of his Pecos county land, but also for the seven-eighths working interest of the developing companies.

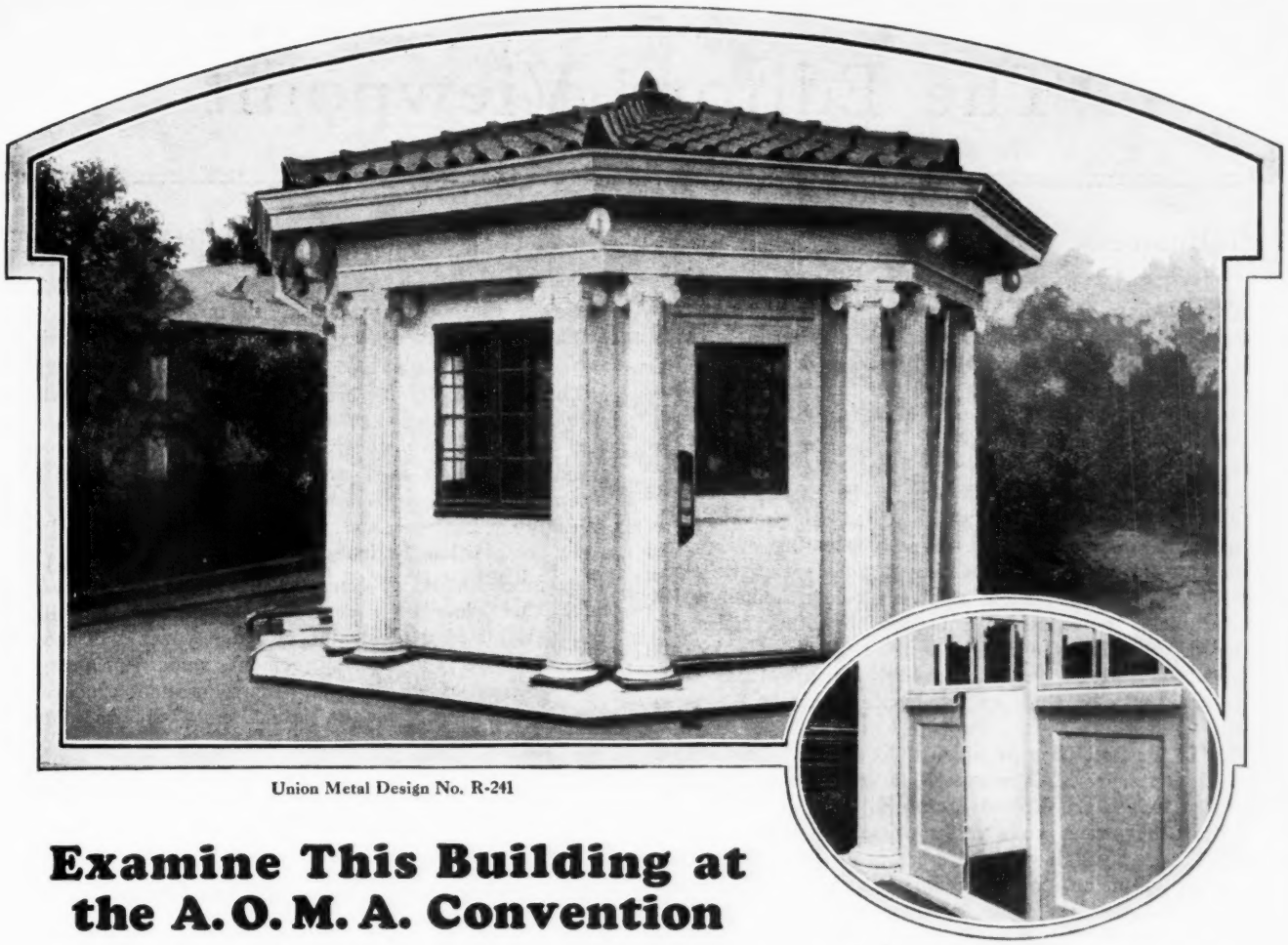
Should the state suit prove successful title to minerals under hundreds of thousands of acres elsewhere in west Texas would be brought into question.

W. B. Hamilton of Wichita Falls, chairman of the oil and gas division of the West Texas Chamber of Commerce, reported progress on a survey to determine means of greater utilization of fuel oil in Texas industries.

A VETERAN of Ranger development, who led the homecoming parade, was W. K. Gordon, formerly vice president of the Texas Pacific Coal & Oil Co., under whose management the discovery well was drilled. Mr. Gordon, who regularly covered the Ranger country on horseback in boom days, was astride a prancing charger in the parade.

An oil field supply exhibit in one of the downtown buildings was participated in by the following companies: Marion Supply Co.; Frick-Reid Supply Co.; Continental Supply Co.; National Supply Co.; Wagner Supply Co.; Standard Tank and Steel Works; Oil Well Supply Co.; Bridgeport Machine Co.; Transcontinental Oil Co.; Texas Pacific Coal & Oil Co.; Hagaman Refining Co.; and Longhart Supply Co.

CHICAGO, Oct. 23.—Frank O. Singleton, for many years the director of safety in the marketing division of Standard Oil Co. of Indiana, and one of the pioneers in accident prevention work at bulk and filling station, this week was appointed director of safety for the Chicago public school system. The office was newly created by the board of education.



Union Metal Design No. R-241

Examine This Building at the A.O.M.A. Convention

In conjunction with Crane & Company, Union Metal will exhibit this ornamental filling station at the West Baden Convention. You are particularly urged to examine these particular points in its construction.

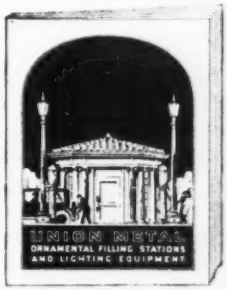
1. The highly ornamental exterior design.
2. The double-panel construction which gives an insulating and fire resistive effect equal to a masonary wall.
3. The clean, finished appearance of the exterior.
4. The good, sound engineering features of all parts of the building.
5. Its absolute completeness.

This is just one of the fourteen highly attractive designs manufactured by Union Metal—each constructed to fulfill a particular filling station need.

Examine this building carefully and then ask for a complete catalog. Don't place your order for additional stations until you become acquainted with the Union Metal line.

This double panel construction is exclusive with Union Metal. It keeps buildings cool in summer, warm in winter and is a most effective fire barrier.

If you are unable to attend the convention, be sure to send for your copy of this new catalog. In it you will find a complete presentation of Union Metal design, construction and engineering features. Send for your copy today.



THE UNION METAL MANUFACTURING CO.

General Offices and Factory, Canton, Ohio

Branches — New York, Chicago, Philadelphia, Cleveland, Pittsburgh, St. Louis, San Francisco, Los Angeles, Jacksonville.

UNION METAL
ORNAMENTAL FILLING STATIONS

The Editors' Viewpoint

National Petroleum News

All Business Is Interested

A DECISION by the United States Supreme court upholding the law of Lincoln, Neb., which established that city in the gasoline distributing business, with a municipal station, would virtually mean a new era for American business. That is why the case recently taken up by the Standard Oil Co. of Nebraska, will be watched by all lines of business.

If a city operating under a home rule charter, can confer upon itself power to engage in gasoline selling, then there is nothing in the world which can prevent such municipalities from taking over and operating every line of human activity, from becoming in fact socialistic communities. Such a precedent established in home-rule cities would quickly be taken advantage of by other cities, by state and perhaps the federal governments. No investment of capital of any kind would be safe from competition by city or state operated enterprises in the same line.

This is the first time in which the question of municipal or state enterprises in competition with private capital has been before the United States Supreme Court in this guise. Other cases have set up that the enterprise the state was engaged in was of a public utility nature, and consequently under state or municipal jurisdiction; others have set up that the state was dealing in necessities of life and that the function of protecting its citizens gave the authorities the power to engage in private business; still others have maintained that emergencies or peculiar conditions existed which made it advisable for the state to engage in some particular line of private business.

The issue now is the right of a municipality to engage in a purely private business, using for the purpose public property and public funds, allegedly at least, in furtherance of a public purpose. The point upon which the high court of the land will have to pass is what constitutes a public purpose. People have been accustomed to look upon a public purpose as a function of government, which has been carefully prescribed by law, such as military and police protection, care of highways and streets, and so on. If a public purpose is to be subject only to definition by a state or municipality, there is no limit to which the state may not go in engaging in activities which have heretofore been looked upon as the field of private capital.—V. B. G.

Competition Would Still Exist

SOME there may be who may comment sarcastically on the squirrel food diet at Battle Creek, Mich., but the following from Henry L. Doherty, now sojourning there may strike the average layman as having sound sense in it:

"We engineers seem never to have been able to even tell our own story to our own lawyers.

"Many of our best petroleum engineers still talk about competitive drilling or competitive drainage, and, therefore, our lawyers cannot be blamed for doing the same thing. We are allowing the public to believe that we want to be relieved from competition that is common to other lines of business.

"This is not true. What our lawyers and engineers refer to as competitive drilling, bears no more relation to the ordinary risks of business competition than what occurs in the violent ward in an insane asylum, when compared to what occurs in the conduct of a business man's luncheon club.

"The discovery of oil brings on a mad scramble whereby each property owner tries to rob his neighbors of their oil. If our laws were changed so that we were forced to develop each pool as a unit, we would still be on an equal competitive basis with the bituminous coal mining business and surely no one would call this a non-competitive business."

The much talked of Sherman anti-trust act, to amend which there has been considerable talk in the oil industry, is aimed at restraint of trade which will lead to monopoly. Certainly an agreement among property or lease holders of a district to develop and produce oil then in the light of the latest and best engineering knowledge does not classify itself easily as a monopoly in restraint of trade.

Maybe we had all better go to Battle Creek for a while, at least quit eating so much raw meat.—W. C. P.

Why Play Up Price of Gasoline

WHY should the oil industry post its gasoline price on large signs on the public highways?

The industry gets warm under the collar at the public's discussion of gasoline prices and yet on a bird's-eye-view of the oil industry, which discloses nothing but gasoline price signs, one can't help but wonder if the industry's own policy is not almost entirely responsible for that constant discussion of price.

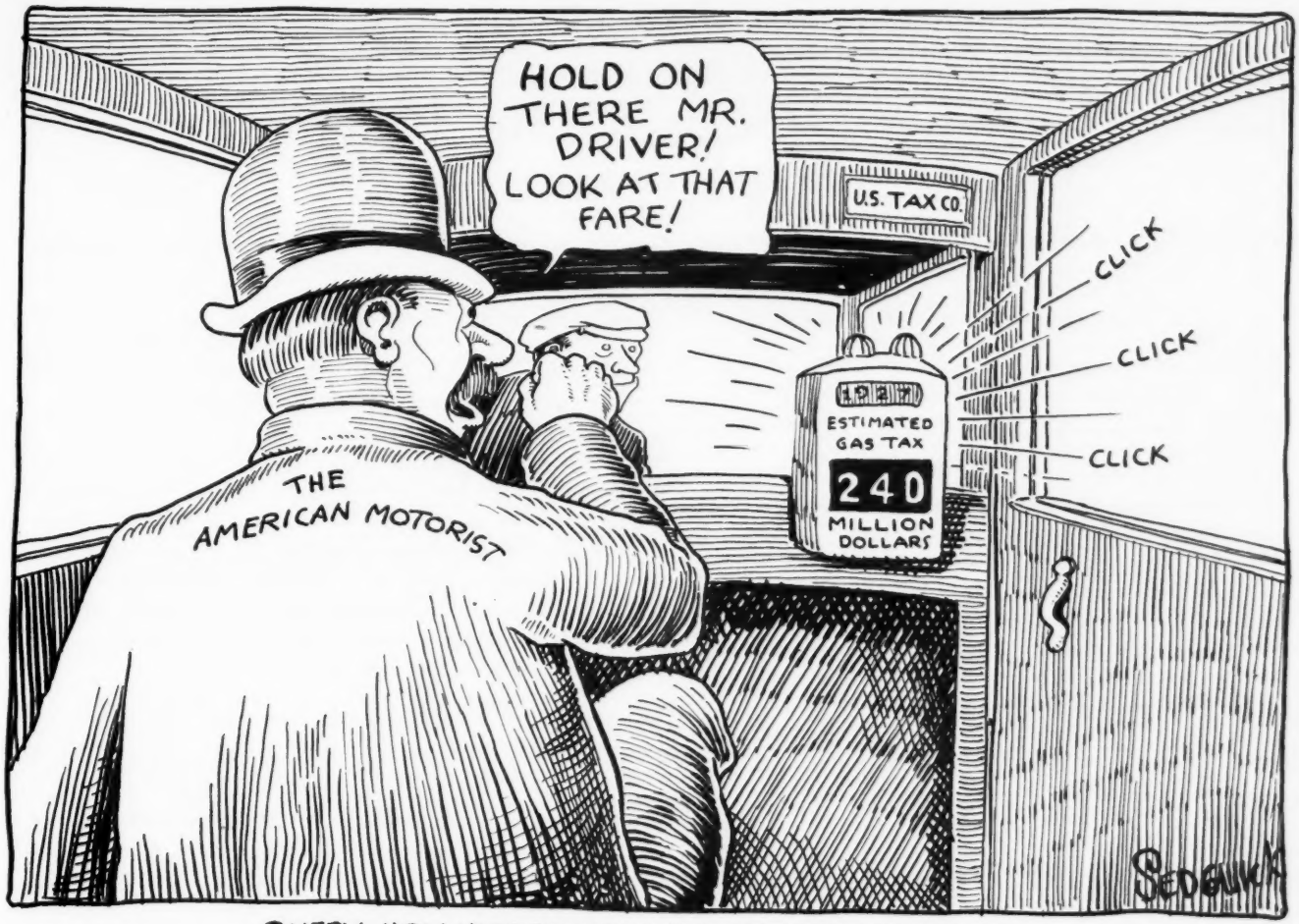
The most elementary thing about advertising is that if you talk about a thing enough, either in printed word or by word of mouth, public attention will be centered on that thing.

For years and years the oil industry has had out in front of every service station and on every gasoline pump generally a large sign—and never a very small sign—showing the price of gasoline. There probably are a million and more signs of gasoline price over the country.

When one analyzes it, one will fail to find any real merchandising reason for that publishing of the price. It is necessary, of course, to have the official price posted somewhere that the customer can see it when he pays the bill, but it isn't necessary to put that price out in letters a foot high at the curb, or put it on four or five signs around a station.

Today the oil industry hails a man coming down the street with a shout "gasoline 19 cents" and that is all the oil industry really shouts.

Marshall Field & Co. at Chicago hail you with the statement that there is just the article that you want inside but they don't disclose the price until after you have picked out that article and then they almost whisper it to you. The same is true of Altman at New York—of Tiffany—of the grocery store—of every other business in the country, except the cut price fire-sale type of business.



QUERY: HOW VIGOROUSLY WILL THE GENTLEMAN KICK?

The oil industry is the only one that attracts public attention by a cry of price alone—outside of the fire-sale gentry.

Why shouldn't the oil industry take down these price signs, all except a dignified small sign over near the cash register or right at the pump for the information of the customer only after he has bought the gasoline? There are laws in some states that require posting of the price, but those laws do not say that it is necessary to make the letters two feet high and have all the price signs out on the curb.

One way for the oil industry to get the public out of the habit of talking about the price of gasoline is for the oil industry to quit talking about it itself. Take in the gasoline price signs and in their stead put signs that the gasoline is good—that the service is excellent and that the customer who comes to that store will get happiness as well as good care for his engine and car.

That famous wholesale hardware prince who lived at St. Louis and served the entire west so ably for years, once said "Recollection of quality remains long after the price is forgotten."

Let the oil industry give the public half a chance to recall the quality.

W. C. P.

Beware of Unions, Says Union Man

THE following comment has been volunteered by a union man whose attention was called to our series of editorials in recent issues pointing out some of the difficulties of unions in business.

"I have been reading with keen interest, your opposition to unionizing the oil industry. Your stand is well taken and I hope the oil industry will resist the attempt to the last ditch.

"I have been a member of the B. of L. E. since 1919—carrying membership in the Firemen's organization for 10 years prior thereto—and am quite conversant with union rules and tactics. While it is my belief that members of our craft—at least the older men—have a broader viewpoint than those of other unions, the fact remains that it takes an expert to interpret many rules and it happens that a railroad is penalized frequently by paying men for work not performed.

"But one must bear in mind that unions are not easy to deal with and once you are in their grip, you'll have the time of your life to get rid of them.

"I have been actively engaged in subduing propaganda of every sort; a good many men holding membership in a union seem to think that business institutions are only existing for their special benefit; that when they come to work they are 'accommodating' the employer.

"Considering tactics of so many unions and their leaders in the last few years, there is every reason why the oil industry should endeavor to keep these union business wreckers out. If I were running a business, every one would have to justify his existence in any given place or out they'd go, regardless of their union. If an outfit pays good wages they are entitled to good work and lots of it.

"For an automobile salesman makes his money by talking; but it is different with other vocations. I never saw anyone moving a box-car by talking about it and I must confess that there is a lot of talk in unions, but damn little action of the right sort."

W. C. P.

Visiting Around the Refineries

By Paul Truesdell

National Petroleum News

Use of Steam in the Oil Refinery

IN AN extremely interesting article in Chem & Met, A. G. Peterkin Jr., development engineer of the Atlantic Refining Co., Philadelphia, states that for every gallon of crude oil run to finished products in a refinery, more than a gallon of water is converted into steam. He enumerates the uses to which this steam is put as follows:

1—Pumping oil and water. 2—Heating oil in storage and process (condensing in closed coils). 3—Simultaneous agitation and heating by direct injection into the oil. 4—Distillation of oil at temperatures below the boiling points by direct injection into the oil, the heat being supplied in some cases by the steam itself, and in others by oil, coal or gas fire. 5—Refrigeration for wax removal. 6—Production of electric power. 7—Miscellaneous uses, scavenging apparatus of flammable vapors, blowing out lines, fire protection, etc.

Getting Rid of Coke from Cracking Stills

H. G. OSBORN, assisant superintendent of the Marland Refinery Co.'s 35,000-barrel plant at Ponca City, Okla., has an interesting article in a recent issue of the Marland Service Man, on the disposal of coke. The three cracking processes used at the Marland refinery, Fleming, Cross and Dubbs, make about 230 tons of coke a day. The company has put in about a half mile of narrow gage railroad track, two locomotives, 12 cars and a steam shovel to handle the coke.

The company has contracts for about 30,000 tons of coke both for industrial and for domestic use. In industrial plants the coke is used both in powdered form and on chain grate stokers. A considerable amount is used for firing in the Marland plant.

Mr. Osborn states that a chemist has determined petroleum coke contains the following metals, in varying amounts: vanadium, tin, lead, cobalt, gold, uranium and silver. Some scientists believe there is a possibility that the combined value of these metals may some time make it practical to recover them.

It will be remembered that several months ago, NATIONAL PETROLEUM NEWS published the claims of a patent granted to Dr. Alfred Oberle covering recovery of vanadium oxide from petroleum coke.

Wins Refinery No-Accident Award

THE silver cup awarded each four months by the Barnsdall Refining Co. to the refinery superintendent having the fewest accidents in his plant during the period, now rests in state in the office of Gordon T. Granger, superintendent of the company's Okmulgee refinery.

During the four months ended Aug. 30, the Okmulgee refinery, which I believe runs about 5000 barrels a day, did not have a single lost time accident. The company's Wichita, Kan., refinery was second in the safety competition, with only one accident, occasioning four days' lost time.

The Barnsdall, Okla., plant, while it showed considerable improvement over the corresponding four months in 1926, had four accidents causing 23 days' lost time. However, the Barnsdall plant is considerably larger than any of the others and chances of accident are therefore greater.

The results of the safety competition are announced in the October issue of Barnsdall, the company house organ.

Things That Happen in Refineries

IN "THE LOOK BOX", organ of the refining department of The Texas Co., is listed a number of accidents that have happened to refinery workers lately, together with the lost time due to these mishaps. So that workers in other plants may keep their heads up and watch their step, these accidents are listed here.

"Working in bubble tower. A chain fell from above hitting employe on forehead and cutting deep gash. No time lost.

"Tightening main bearings on a machine when wrench slipped, cutting workman's fingers badly. Six days lost from work.

"Five workmen carrying a pipe. One let go his end unexpectedly, throwing too much weight on another man and causing hernia which may make an operation necessary.

"Loading shooks in box car, employe scratched his arm slightly on a wire around the bundle. Did not report to first-aid room until late that day and was unable to report for duty next day. Doctor administered tetanus serum.

"Fitting bolts on pipe. Live wire hanging above came in contact with employe's body knocking him down on concrete pavement. He was lucky to escape with a few bruises and burnt shoulder. No lost time.

"Brick mason working on a still dropped a brick on a man's head, cutting a deep gash. No time lost.

"Grating over hot water ditch gave way under man and dropped him into hot water, burning both feet. No time lost.

"Employe opened valve in an acid line wide and acid sprayed out, burning his face and body. Lost 18 days time.

A little care would have avoided all of these accidents.

Principles of Operation of the Plunger Pump in Oil Wells

By Lester C. Uren
Professor of Petroleum Engineering, University of California

Article 1

Five Articles on Oil Well Pumping

THIS is the first of a series of five articles reviewing recent literature on oil-well pumping practice. The present article has been devoted to an analysis of fundamental principles which determine the mechanical efficiency of the plunger pump in oil-well service. The general form and manner of operation of the plunger pump are first briefly described, and its operating cycle explained. The motion afforded by the walking beam is analyzed and its resultant effect on that of the plunger is described.

Though from one point of view, due to elastic elongation of the sucker rods under the strain imposed, it might appear that a large part of the beam motion is lost between the plunger and the beam, it is shown that this effect due to stretch in the rods is to some extent compensated for by other elastic phenomena which cause lag in transmission of energy through the rods and their resulting contraction during a portion of their stroke.

The character of loading on the sucker rods is analyzed, and found to consist of a number of components, both static and dynamic, which in deep wells result in stressing the metal used almost to its elastic limit, for the sizes of rods commonly employed. The causes of plunger and valve leakage and inefficiencies resulting therefrom, are explained. The effect of plunger velocity on pump efficiency is discussed and it is shown that for the same plunger travel, a long, slow stroke is more efficient than a relatively short and quick stroke.

The next article in this series, explaining the effect of submergence, gas, sand, water, and other related factors on plunger pump efficiency, will appear in an early issue of NATIONAL PETROLEUM NEWS.

THOUGH the interest of oil producers seems to have centered, of late, about the gas-lift and other methods of producing oil by natural or induced flow — which have been discussed in earlier articles of this series—the fact remains that by far the greater number of our producing oil wells can yield their oil only through the instrumentality of some type of mechanically operated pump.

The greater part of the oil brought to the surface today, is produced by pumping methods rather than by flow methods and the pumping devices employed and their principles of operation are therefore matters of prime importance to the oil producer.

Of the various types of pumps that have been used and proposed in the pumping of oil from wells, the only one that has attained practical use is the plunger pump, which, however, has been developed for this purpose in a variety of different forms. This type of pump, when reduced to its elments, is simple and can be so ruggedly constructed and operated successfully under so wide a variety of conditions that it may be adapted to oil well service in a way not possible with any other pumping mechanism.

The oil producer has, generally speaking, been content to approach his pumping problem on an empirical, cut-and-try basis, with little regard to the underlying principles which determine the mechanical efficiency attained: often indeed, with little knowledge of these fundamental principles. As a result, the mechanical efficiency has often been very slow, in many cases, to the point of seriously restricting the current rate of production and ultimate yield of the wells.

When we consider the great number of variables which influence the mechanical efficiency of the plunger type of pump, and the intricacy of their relationship, it is surprising that the pioneer oil producers, with their limited knowledge of the fundamental principles controlling pump efficiency, were able to do as well as they have. Perhaps this has been because in years past, production has been secured from relatively shallow depths, at which pump inefficiency is a matter of less moment than in the deeper territory now being exploited.

Successful pumping of oil from depths of 4,000 feet and more, which is a practical requirement in some fields at the present time and which will become increasingly common in future years, requires a greater measure of operating efficiency that can be attained only through a more intimate understanding of fundamental principles.

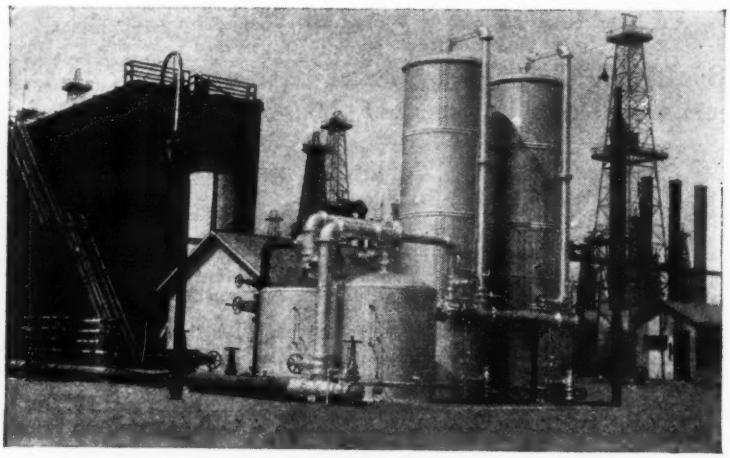
This article and the one succeeding, which are offered as a brief review of the factors influencing plunger pump efficiency, are the first of a series of five relating to the general subject of oil-well pumping practice. The third and fourth will be descriptive of the various types of plunger pumps and oil-well pumping accessories, and the fifth will review recent progress in application of power in oil-well pumping service.

IT IS assumed that the reader is already familiar in a general way with the form, assembly and manner of operation of the type of plunger pump commonly used in oil well service. Figure 3 will serve to recall the names and relationship of the component parts of the usual oil-well pumping mechanism. The pump is of the simple displacement type in which a plunger equipped with a working or traveling valve is given a vertical, reciprocating motion in a stationary working barrel. The latter is suspended from the surface on tubing, submerged in the well fluid and is equipped at its lower end with a stationary standing valve.

The simple cup-leather packed plunger of Figure 1 has its counterpart in the long, hollow, cylindrical polished steel plunger of Figure 2; otherwise these two common types are identical in the form and arrangement of their essential parts. Figure 2 shows the additional feature of a "garbutt rod" a device which facilitates removal of the standing valve with the plunger when repairs are necessary. The valves are usually of the ball and disk-seat type illustrated in Figure 4.

The pump plunger is actuated by a column of "sucker rods" extending through the tubing on which the working barrel is suspended, from the top of the plunger to the surface. Just below the casinghead, the column of sucker rods connects with the lower end of the "polish rod", which operates through a stuffing-box in the top of the tubing, the upper end being suspended with the aid of an "adjuster grip" from the end of the walking beam.

A side outlet in the tubing, just below the stuffing-box- connects with the "lead line" through which the oil lifted by the pump is led to a gas trap, storage tank, or sump. An oscillating motion is imparted to the



A 25,000 gallon Campbell Plant at Alamitos Heights, Calif., installed for General Petroleum Corporation.

More Proof of Campbell Preference

As proof of recognition which Campbell plants have gained we cite the fact that 60% of all new natural gasoline plant construction in California during the past year was designed and installed by us. Of the remaining 40% our Absorbers were used in 75%. This record speaks for itself.

You'll be interested in our New Catalog.

J. A. Campbell

Consulting—Designing—Constructing
Natural Gas Engineer

P. O. Box 669 LONG BEACH, CALIF.

CAMPBELL
OIL FROTH
absorber

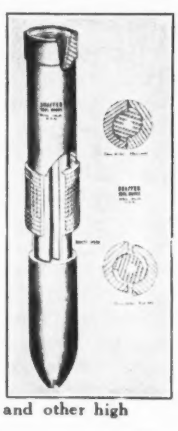
SHAFFER

T & T Back-Off Socket
T & T Back-Off Spear

Two Tools with a Single Thought

If the fish won't come, you do not have to leave the tools in the hole for a double fishing job.

A Socket and a Spear for rotary tools. With the aid of either of these devices the operator can take hold of his fish or casing by turning one way, and release, if necessary, by reversing. Both tools are made right or left hand in all sizes and may be used for either unscrewing or pulling jobs. Write for further particulars.



SHAFFER TOOL WORKS

Brea, California, U.S.A.

Manufacturers of "Shaffer" Casing Heads, Adjustable Flow Beans, and other high grade oil field specialties

walking beam by a pitman and crank actuated by a power-driven band wheel.

A steam, gas or oil engine or an electric motor may be the source of power. For the pumping of comparatively shallow wells, operated in multiple by a system of pull lines from a central power station, a "pumping jack" is substituted for the band wheel-pitman-walking beam assembly.[1]

The plunger makes from 15 to 40 up-and-down strokes of from 24 to 60 inches per minute. The speed is controlled by that of the engine or motor, while the length of stroke is adjustable by placing the wrist-pin connecting the crank with the pitman, in one or another of the several holes in the crank, at varying distances from the center of rotation. The suspension mechanism for the polish rod is so adjusted that, in ordinary operation, the lower end of the pump plunger does not strike the upper end of the standing-valve cage, and yet approaches it as nearly as is practically feasible at the lower limit of plunger movement.

Assuming that the pump plunger is at the lower extremity of its travel, as the up-stroke begins, reduction in pressure is effected in the space between the two valves, the lower valve opening and admitting oil into the work barrel. Inflex of oil continues during the up-stroke of the plunger; but with the succeeding down stroke, the standing valve closes and the oil in the barrel is subjected to pressure which lifts the working valve, the oil being displaced through the latter as the plunger descends.

The next up-stroke of the plunger lifts the oil thus displaced, into the tubing, and draws a fresh supply of oil into the working barrel for a repetition of the cycle. Each successive stroke of the plunger forces additional oil into the tubing, until it overflows into the lead line at the surface. It should be noted that the pump lifts oil only during half of its cycle, that is, on the up-stroke of the plunger.

Character of Motion Given the Sucker Rods by the Walking Beam

CONSIDERATION of the character of motion afforded by the crank-pitman-walking beam assembly, indicates that the movement of the rods is fundamentally simple harmonic. That is, if the crank revolves with constant angular velocity, the plunger is accelerated from a position of rest, at the upper end of its stroke, to a maximum speed at the midpoint of the down-stroke; then uniform negative acceleration results in gradually bringing the plunger to rest at the

1. This brief description of the plunger pump, together with the drawings of Figures 1, 2, 3, & 4, has been taken from a paper by the writer, entitled, "The Problems of Pumping Deep Wells for Petroleum", Trans. A. I. M. & M. E., Vol. LXXIV—pp. 828-854.

lower end of the stroke. The up-stroke is accomplished with an equivalent sequence of movements.

This is an ideal motion for plunger pumping, but is seldom perfectly realized because of the tendency of the engine to increase its speed on the down-stroke of the rods, because the short lengths of the pitman and beam contribute some eccentricity to the motion, and because the elasticity of the sucker rods does not permit the plunger to respond immediately to the movement of the walking beam.

The long column of rods extending down through the well to the pump plunger possesses a definite elasticity which results in a certain delayed action in the transmission of motion from the beam to the pump plunger. If we suspend a weight on a slender coiled spring, and then pull upward on the spring, the latter will stretch before lifting the load. If we jerk the spring up quickly, it will contract to its full amplitude after starting the load, and then stretch again. It seems probable that a very similiar action occurs in a long string of sucker rods suspended in a well.

When the up-stroke begins, the rods stretch under the influence of the load, and in doing so, store up kinetic energy which, during the latter part of the stroke, results in contraction, assisting the plunger in its upward stroke.

During the first half of the down-stroke, kinetic energy is again developed due to the descent of the great mass of the rods, which is expended in stretching the rods as the beam retards the descent toward the limit of its downward travel. Sargent shows[2] that under certain conditions, this elastic contraction and elongation of the rods may operate to increase the rod movement, so that the stroke of the plunger may actually exceed that of the beam, and stresses the fact that the upward travel of the plunger is accomplished in but a fraction of the time occupied by the up-stroke of the beam.

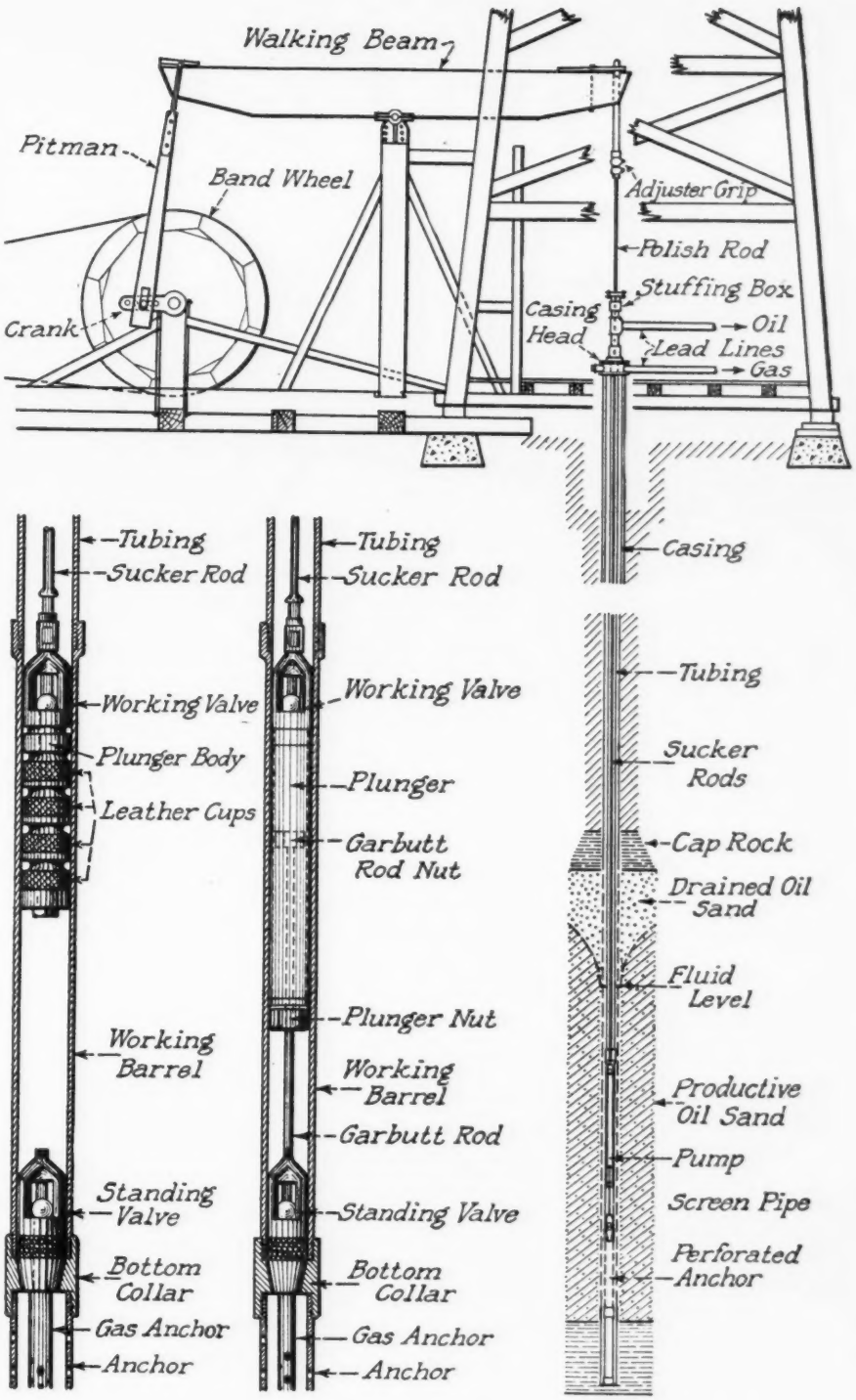


Fig. 1—Leather-packed Type of Plunger Pump *Fig. 2—Steel-plunger Type of Plunger Pump* *Fig. 3—Power Connections for Plunger Pumping*

THAT this elastic contraction and elongation of the rods is a factor of importance in determining the length of the plunger stroke, has been proven by examining scorings made by sucker-rod joints on the inside of the tubing in 4,000-foot California wells, which indicated that the plunger had a stroke of approximately 90 per cent that of the beam.[3] This would seem to indicate that the prevailing idea that a large part of the stroke of the beam is lost in deep wells, due to elastic elongation of the rods, is a fallacious one, though it may be true for a particular rate and length of stroke in any given case.

Willrich shows[4] that in deep wells pumping on the beam, the lag caused by the elasticity of the rods, may be as much as 180° of the crank movement, or even more, so that the maximum load on the beam occurs near the top of its stroke instead of at the bottom, as would be the case with an inelastic medium.

Since the upper and lower ends of the column of rods are traveling with different velocities, or even in opposite directions in extreme circumstances, it follows that there must be acute and frequent stress reversals in the rods. The result is a vibratory jar or "hammer" in the rods, causing fatigue of the metal and ultimate parting. Rupture of the rods occurs most frequently near the bottom of the column, where this stress is developed to the highest degree.

These considerations indicate that for any given column of rods, there is

2. Sargent, S. B., "The Cycle of an Oil-Well Pump", Oil-Field Engineering, November, 1926, pp. 43-48.

3. Swigart, T. E., "Long-Stroke Pumping". See pages 97-98 of a book entitled, "Petroleum Development and Technology in 1925", published by the American Institute of Mining and Metallurgical Engineers, May, 1926.

4. Willrich, E. G., "Mechanics in Pumping of Oil Wells", Oil and Gas Journal, January 13, 1927, pp. 76, 78, 82.

Winter

ils

Low COLD TEST Motor Oils

of 100% Pure Pennsylvania Paraffin Base Crude

ESPECIALLY refined to meet most rigid requirements of the new High Compression, High Speed Automobile Engines.

At all speeds, on long or short drives, on warm or bitter cold days you will find our special process motor oils giving correct lubrication. Penreco oils insure easy starting at the average garage temperature on a winter morning.

This means almost instant lubrication, a reduction in your customer's repair expense—and, not least, satisfied, repeat patronage.

On the road at fifty, sixty, seventy and even more miles an hour Penreco special process oils maintain a high viscosity under extreme engine temperatures and a tough coating of protection for your customer's cylinder walls and bearings. High flash and fire points mean a low loss from evaporation and a minimum deposit of carbon under the most trying operating conditions. You will be pleased with your customer's reaction to this superb line of motor lubricants.

SPECIAL PROCESS MOTOR OILS

Low Cold Test
Low Carbon Content
High Flash and Fire
Triple Filtered
Straight Still
Reduced to the Proper Viscosity

Guaranteed 100% PURE PENNSYLVANIA OIL

Let us explain how Penreco products will help you to attract new customers, hold old customers, build business and make real money for you. Write us for full details of our attractive contract proposition on your 1928 requirements.

Pennsylvania Refining Company

Refiners Pennsylvania Petroleum Products

Karns City, Pa.

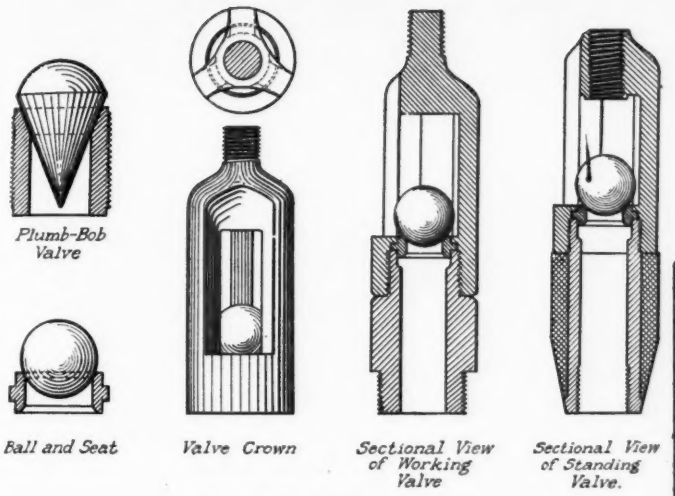


Fig. 4—Plunger-Pump Valves

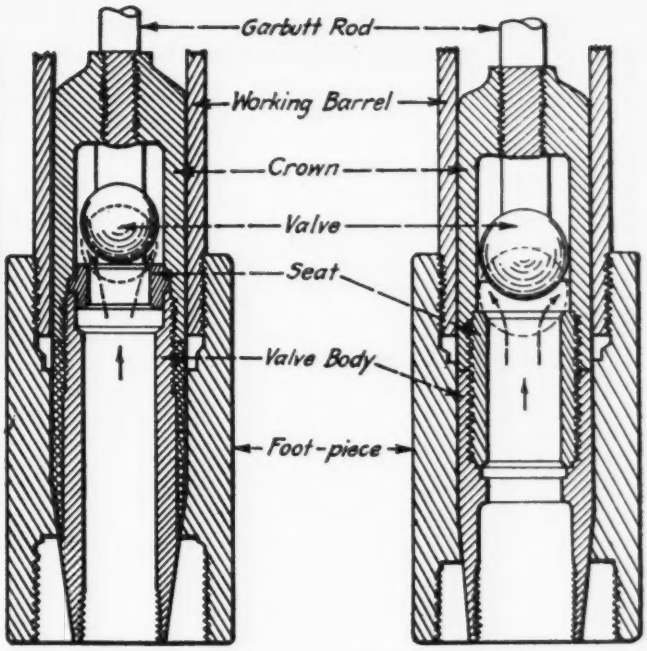


Fig. 5—Common Form of Standing Valve with Reversible Disc Seat

Fig. 6—Oversize Standing Valve with Reversible Cylindrical Seat

a certain periodicity in the elastic elongation and contraction, determined by the length and rapidity of stroke, the length of the column of rods, the elasticity of the metal and the load applied. Slight changes in the length of stroke of the beam, or in the number of strokes per minute will result in important changes in the plunger movement and in the position of the beam at which stress reversals in the rods occur.

It is evident that the tubing is also subjected to reversals of stress, causing its elongation due to the weight of the oil which it must support, during the down-stroke of the plunger, while contraction occurs during the up-stroke when the weight of the column of fluid is taken by the rods. This results in shortening the effective stroke of the plunger. Sargent[2] shows that a 4,000-foot column of 2½-inch tubing stretches 4.6 inches due to the stress thus imposed.

Sucker Rod Stresses

THE total stress on the rods composing the upper end of the column of sucker rods, is determined by the sum of the static or dead load of the rods and plunger and of the oil within the tubing above the plunger, and the dynamic or live load occasioned by the lifting and acceleration of the rods and column of oil in the tubing. The weight of the rods is ordinarily the greater of these loads, but will vary with the length of the column and with the size of rods used.

The static load of the oil within the tubing, bearing down on the plunger when the standing valve is closed, will depend upon the depth of the plunger below the point of discharge, the diameters of the plunger and sucker rods, and the density of the fluid within the tubing.

The difference between the areas of the plunger and sucker rods, multiplied by the depth of the working valve below the point of discharge, and by the weight of the fluid per unit of depth, gives the total oil load. In computing the total static or dead load, still another force resisting movement must be taken into consideration.

This is the force necessary to move the plunger in the working barrel, which however, is a load of comparatively small magnitude in comparison with the oil and sucker-rod load. The writer has computed the total static load for a column of 1-inch rods in a 4,000-foot well using a 2.75-inch plunger and pumping 17.5° oil, and finds it to be about 20,000 pounds.[1]

THE dynamic load on the sucker rods, applied when the pump is set in motion, is the force necessary to accelerate a mass equivalent to the total static load, from rest to the maximum upward velocity attained during the up-stroke. Insofar as the beam motion is concerned, it would be a comparatively simple matter to compute the rate of acceleration and the force necessary to accomplish it, but computation of the plunger acceleration presents a more difficult problem in that the time within which the up-stroke is accomplished and the actual length of the plunger stroke are somewhat uncertain due to the elastic properties of the sucker rods.

Assuming that the plunger stroke is equivalent to that of the beam, and that the latter makes 25 three-foot strokes per minute, and the 1-inch rods are used with a plunger 2.75 inches in diameter, the writer has calculated the dynamic load on a 4,000-foot column of rods to be 6,380 pounds. It will be noted that the dynamic load is less than one-third that of the static load computed above for the same conditions. The resistance of the oil column to upward translation is augmented by the viscous drag of the oil on the metal rods and on the inner walls of the tubing, but this represents a relatively small load, and one which we have no very precise means of calculating.

In deep wells, the total loading on the rods, obtained by the summation of the static and dynamic loads, often approaches the elastic limit of the steel used. In the case of the 4,000-foot column of 1-inch rods for which loads are calculated above, the total load is 26,720 pounds, which for a rod 1-inch in diameter, represents a unit stress of 34,021 pounds per square inch of cross-section.

The elastic limit of the steel used in sucker rods is usually 40,000 to 45,000 pounds, though some manufacturers are now using metal having a yield point of from 55,000 to 60,000 pounds. A 1-inch rod is unusually large, and most operators use rods only ¾-inch or ⅞-inch in diameter, even in deep well pumping, which provides an even smaller margin of safety. In many instances, however, wells are still producing with high fluid levels, or with considerable gas in the oil, which reduces the load on the rods, else rod failures would be far more frequent than they are.

Elastic Elongation of Sucker Rods

UNDER the great stress imposed, the long column of sucker rods undergoes considerable elongation. The writer has computed the elastic elongation of the 4,000-foot column of 1-inch rods, stress computations for which have been made above, and finds that the elongation between maximum and minimum stress on the up and down strokes, would be about 31 inches, only 5 inches less than the stroke of the beam.[3] Willrich has conducted tests[4] on a 4,050-foot column of ¾-inch rods in a well in the Signal Hill field, California, operating a 2½-inch pump, lifting only 9

barrels of oil and 25 of water and b. s. per day. The well also produced 20,000 cubic feet of gas per day, causing it to "head". The mean position of the fluid-level in the well, outside of the tubing, was not determined.

Computations show that this column of rods had an elastic elongation of 40 inches, or approximately the same as the beam stroke, pumping being conducted with the wrist-pin in the third hole of the crank. This is equivalent to an elastic elongation of 1-inch per 100 feet. Were it not for the elastic "lift" and "reach" of the rods on the up and down stroke described in an earlier section, it is evident that in wells of such depth, the plunger would have very little motion in the working barrel, and little or no oil would be pumped.

It seems probable that the low recoveries obtained in many deep wells, after installing pumps—in comparison with their productions by natural flow or gas lift—is due to pump inefficiency occasioned by elastic elongation of the rods, and failure on the part of the operator to make use of pumping strokes and speeds which will provide the elastic contraction on the up-stroke necessary to offset normal elongation of the rods.

Sources of Mechanical Inefficiency in the Oil-Well Plunger Pump

MECHANICAL inefficiency in the pump may be due to a variety of causes, the more common of which are the result of worn plungers, working barrels and valves, the presence of sand or gas in the oil handled, inadequate submergence of the standing valve, or too rapid a movement of the plunger. Because of these inefficiencies, the pump will often deliver far less fluid than its theoretical plunger displacement would lead one to expect.

Wear of the polished surfaces of the working barrel and plunger, will permit of leakage around the plunger under the high pressure developed by the column of fluid in the tubing. New pumps intended for deep-well service are finished with a clearance of only 0.00025-inch between the outer surface of the plunger and the inner surface of the plunger or liner, but normal wear gradually increases this; and if sand finds its way between the polished surfaces, destruction is rapid.

The importance of securing and maintaining a proper clearance between the plunger and the barrel is apparent when it is remembered that the pressure of the oil in the tubing, bearing down directly on this clearance space, may be as great as 2000 pounds per square inch in a well 5,000 feet deep, and any oil which is able to pass through the clearance space during the operation of the pump, decreases the over-all efficiency by so much.[5]

Though every precaution is taken by the better equipped pump manufacturers to maintain the bore of the working barrel, or that of the liner, absolutely straight and uniform in diameter, it is very difficult to do so, especially in the longer barrels, and as a result of irregularities of this sort, the wear is not uniformly distributed and plunger leakage results.

THIS difficulty can be largely overcome through the use of a rod rotating device, which may be attached to the walking beam and polish rod, causing a partial revolution of the rods with each stroke of the beam, and thus distributing the wear caused by inequalities in alignment and diameter of the plunger and working barrel.[6] Some operators have sought to overcome this difficulty by the use of several short plungers closely spaced, with flexible connections, instead of making use of a single long plunger.[7]

The shop clearance provided between the plunger and working barrel, is not necessarily maintained when the pump is placed in the well. Prevailing ground temperatures at depths of 3,000 feet or more beneath the surface often range from 125° to 175° Fahr., and at such temperatures, unequal expansion of the plunger and barrel may alter to some extent the clearance originally provided. Increase in the clearance space will result in greater leakage around the plunger, while decreased clearance throws an additional load on the sucker rods. However, computations based on the relative coefficients of expansion of steel and cast iron, indicate that excessive changes in plunger clearance are not likely to occur at the temperatures normally prevailing in oil wells.[8]

With the high oil pressures developed in deep wells, the clearance space between the plunger and the barrel will be influenced to some extent by distortion of the relatively thin walls of the plunger. On the down stroke of the pump, the oil pressure is applied on the inside of the plunger, but is offset by an equivalent pressure within the clearance space between the plunger and the barrel; while on the up-stroke, a great reduction in pressure occurs within the barrel—possibly to a pressure approaching atmospheric.

The result is theoretically, an alternate contraction and expansion of the plunger, which though probably small in magnitude, may nevertheless influence plunger clearance to an appreciable degree. It is particularly objectionable in that expansion occurs on the down stroke, retarding free descent of the plunger, while contraction comes on the up-stroke when minimum clearance is most needed.

This difficulty may be overcome by placing the working valve at the lower end of the plunger instead of at the top. The full oil pressure is thus always applied, both within and without the plunger, and the plunger clearance is not subjected to continual fluctuation in volume with each stroke reversal.

Influence of Valve Action and Design on Plunger Pump Efficiency

IN EFFICIENT valve action and irregular wear of the valves due largely to the scouring effect of sand in the oil, is a common source of difficulty in operation of oil-well plunger pumps. The usual form of valve, as illustrated in Figure 4, consists of an accurately ground sphere of special steel, supported on an annular, bevel-edged seat. This type of valve is secure against high pressures as long as the ball and seat retain their original accuracy of form and smoothness of surface, but after a period of use in oil-well service, they often develop irregularities in shape due to unequal wear, particularly when sand is carried through the pump with the oil.

As a result, the security of the valves is partially destroyed, and a part of the oil in the working barrel is forced back through the standing valve on the down-stroke of the plunger, and some flows back into the working barrel on the up-stroke of the plunger. Under the high pressures to which the pump is subjected in deep-well service, a very slight imperfection in valve fit may result in loss of pump efficiency, and if oil-containing sand is forced rapidly under high pressure, through small apertures between the valves and seats, these apertures are rapidly enlarged until the valves cease to serve their intended purpose and must be replaced. In extreme cases, valves may have to be replaced every few days due to sand scouring.

Efficient action of the pump requires that the space within the working barrel, between the two valves, be completely filled with oil on each up-stroke. This can be accomplished only by the suction of the ascending plunger and by the submergence of the pump, which provides static fluid pressure tending to force the oil upward through the standing valve.

Due to the presence of gas in the oil, which is released on reduction of

5. Cassidy, H. E., "Deep Well Pumping and Attendant Problems", Oil-Field Engineering, August, 1926, pp. 51-53.

6. Suverkrop, L., "Plunger Rotors", Summary of Operations, California Oil Fields, October, 1924, published by California State Mining Bureau.

7. Zublin, J. A., "Pumping Deep Wells in California", paper read before the Forth Worth Meeting of the American Petroleum Institute, December, 1924, Bulletin American Petroleum Institute, Volume V, No. 75, December 31, 1924, pp. 55-61. Also printed in Oil Weekly, December 19, 1924, pp. 35-38.

8. Sargent, S. B., Personal correspondence with the writer.

ANNOUNCING

Dr. G. G. Brown

at the American Oil Men's Convention

A feature of the Convention of the American Oil Men's Association at West Baden, Indiana, November 2nd, 3rd and 4th, will be the presence of Dr. G. G. Brown, of the University of Michigan, head of the Research Department of the Association of Natural Gasoline Manufacturers, with a staff of assistants.

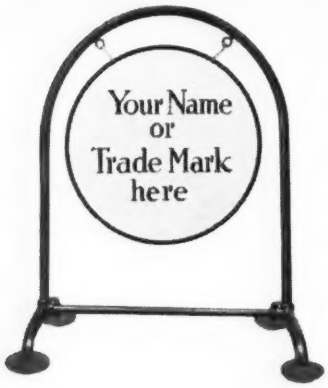
On special equipment consisting of a high compression motor with dynamometer connected, Dr. Brown will make tests on samples of motor fuel submitted by jobbers or refiners. The tests will cover starting, acceleration, power development, anti-knock qualities, and general usability. Dr. Brown will furnish, free of charge, a written report on each fuel tested.

ASSOCIATION OF NATURAL GASOLINE MANUFACTURERS

Research and Educational Committee

Cosden Building, Tulsa, Okla.

Complete report of the first year's research work at the University of Michigan under the direction of Dr. Brown for the Association of Natural Gasoline Manufacturers is now available upon application at the offices of the Association, Cosden Building, Tulsa, Oklahoma. Price $1.00, plus postage.



The Sign Which Says "Buy Gas Here"

This Western curb Service Station sign should form a very important link in your advertising chain. Through your ads you tell them WHY to buy and with this sign you tell them WHERE to buy—a very vital matter if your advertising is to be effective.

These signs are 52 inches high by 29½ inches wide and are of heavy substantial construction. They are cast from gray iron and the base counter balances the most severe wind storms.

We are prepared to render complete service. Art work and designing the sign, supplying the sign itself or furnishing you the frame for your own sign.

The most attention attracting and sales compelling sign on the market. The sign which says: "Buy Gas Here."

Write for prices and full information

The Western Iron & Foundry Co.
Wichita, Kansas

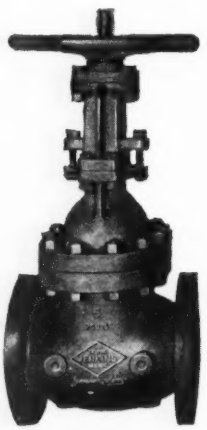


Fig. 204
Flanged, Jenkins Extra Heavy Iron Body Gate Valve

Iron Body Gate Valves —designed for strength

Jenkins Iron Body Gate Valves have globe-shaped body with round-oval neck. This shape, based on the familiar fact that pressure containers possess maximum strength when made in shapes of a circular nature, provides a body possessing great strength as well as pleasing appearance.

Wedges are accurately machined and interchangeable, and wedge guides consist of two ribs of equal width, thus permitting reversal of wedge, insuring tight closing under all conditions.

The handwheel, patterned after the steering wheel of a motor car, provides firm grip and easy operation.

In addition to these features there are a number of other refinements that assure valves which will stand the severest service in the use for which they are recommended.

JENKINS BROS.

80 White Street.....New York, N. Y.
524 Atlantic Avenue.....Boston, Mass.
133 No. Seventh Street.....Philadelphia, Pa.
646 Washington Boulevard.....Chicago, Ill.

JENKINS BROS., Limited
Montreal, Canada *London, England*

Always marked with the "Diamond"
Jenkins Valves
SINCE 1864

pressure, the suction effect of the rising plunger can probably not be counted on to draw the oil in rapidly enough to fill the space between the valves; and if the fluid level in the well is low or if inadequate submergence is provided, the working barrel will be only partially filled on the up-stroke and the volumetric efficiency or displacement of the pump will be correspondingly reduced.

THE standing valve offers considerable resistance to upward passage of the oil through it, and thus also tends to reduce the overall efficiency. If the ball is lifted but a short distance off its seat by the upward flow of oil through the seat, the oil must abruptly change its direction of flow and force its way through a restricted, annular-shaped opening surrounded by angular corners and recesses, which induce turbulence and encourage release of gas from the oil and the formation of emulsion if water is present.

Pump manufacturers have recently given attention to the importance of valve design in reducing frictional resistance at the standing valve, and many now recommend "over-size" standing valves with larger seats and fewer and smaller recesses about the valve. Figure 6 illustrates a typical over-size valve which offers considerably less resistance to oil-flow than the common type of standing valve shown in Figure 5. There has also been a tendency toward the introduction of radically different types of valves, such as the "plumb-bob" valve illustrated in Figure 4, which is said to offer less resistance to the passage of oil through it than the spherical valve. However, its wider seating surface offers better opportunity for sand grains to prevent proper seating. This and other special forms of valves have found but limited use and do not show promise of replacing the spherical type.

The resistance offered by the standing valve to upward passage of oil into the working barrel, is dependent on the rate of plunger travel. As the plunger speed increases, the rate of flow of the oil through the standing valve and the resistance to flow offered by the valve, also increase. It follows that as the plunger speed is increased, the pump submergence must also be increased if equivalent pump efficiency is to be maintained. The most effective plunger speed for a given submergence will also depend upon the oil viscosity, the resistance offered by the standing valve to passage of oil through it, increasing as the oil viscosity increases.[9]

When the working valve is placed

9. Uren, L. C., Sargent, S. B., and Collins, V. J., "Influence of Submergence on the Efficiency of the Oil-Well Plunger Pump", see pp. 157-169 of a book entitled, "Petroleum Development and Technology in 1925", published by the American Institute of Mining and Metallurgical Engineers, May, 1926, or Bulletin, American Petroleum Institute, Vol. VII, no. 27, pp. 110-116.

at the top of the plunger, as is customary in the oil-well plunger pump, the plunger and the space between its lower end and the standing valve are left filled with oil at the end of the down-stroke. On the succeeding up-stroke, this oil that is left within the barrel from the preceding stroke must be accelerated from rest until it attains the upward velocity of the plunger.

This applies also to the oil column in the tubing below the standing valve above the oil inlet of the gas anchor. Computations indicate that the upward static pressure on the standing valve necessary to overcome the inertia of this oil, requires a considerable submergence of the standing valve, being as much as 23.6 feet for a 2-inch pump lifting oil of 0.94 specific gravity.[9] Unless at least this submergence is provided, the working barrel will not completely fill on the up-stroke of the plunger and loss of pump efficiency will result.

Influence of Plunger Velocity on Pump Efficiency

WITHIN the limits determined by the physical ability of the oil to flow through the standing valve and follow the plunger in its upward movement, the capacity of the plunger pump is determined by the rate of plunger travel. It is convenient to compare plunger travel on the basis of total upward displacement per minute, a factor obtained by multiplying the number of strokes per minute by the length of stroke. Thus, 20 six-foot strokes per minute represent a plunger travel of 120 feet, which should theoretically lift twice as much oil as a plunger travel of 60 feet per minute, representing 20 three-foot strokes.

This relationship between the linear rate of plunger travel and the volume of oil lifted, however, will be true only within certain limits, for as the speed is increased other factors will enter to reduce efficiency. The interval between reversal of strokes must not be less than that at which the valves have time to function properly, and on the down-stroke, the plunger must be given time to sink through the oil in the working barrel without buckling the sucker rods. Oil is lightly compressible, hence a part of the down-stroke of the plunger is occupied in compressing oil between the two valves to the pressure of the oil in the tubing above the working valve, before the latter may open.

If free gas is admitted to the pump with the oil, a large part of the downward stroke of the plunger may thus be occupied in compressing the contained gas and oil, and the pump displacement efficiency is materially reduced. Inefficiencies resulting from reversal in tension of the rods as well as those due to operation of the valves, are multiplied directly by the number of stroke reversals per unit of time.

What Price *Price?*

TRUE—you can buy much "cheaper" equipment than OCECO—and sometimes at a slightly lower price—though not often.

Frankly, OCECO has never been made with the thought in mind that competitors are selling equipment at such and such a price and we must so make a product as to meet their prices. Yet, by building OCECO equipment the best we know how, a demand has followed, resulting in quantity production which has brought prices down to the point where they are little if any higher.

In every OCECO product you will find evidence of that same unvarying quality in design, in materials and in workmanship, which has made this equipment the most used the world over by leaders in the industry. And, after all, where an investment of a few dollars is made to protect thousands, isn't the determining factor rather a matter of performance than of a small difference in price?

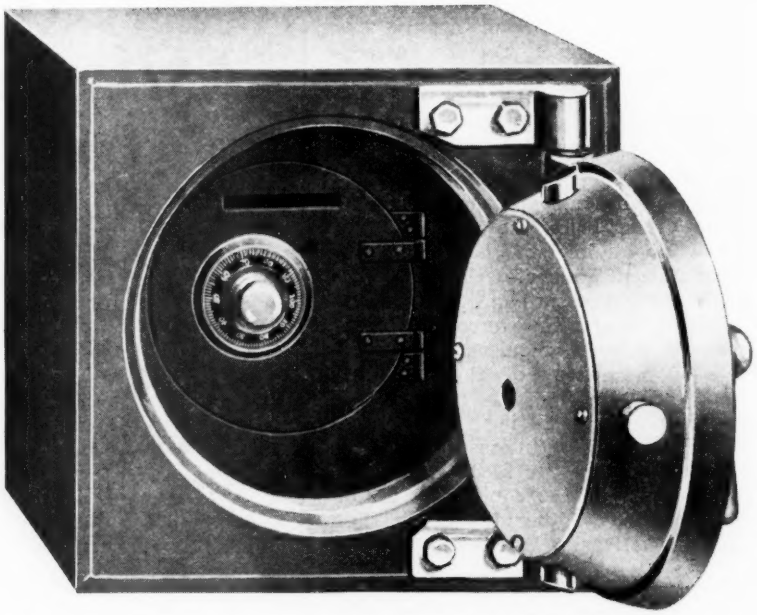
THE OIL CONSERVATION ENGINEERING CO.
877 Addison Rd. Cleveland, Ohio

Engineering and Sales Service:

25 Broadway, New York
O-S Building, Casper, Wyo.
417½ So. Boulder St., Tulsa, Okla.
Box 552, Beaumont, Texas
Neilan, Schumacher & Co., Los Angeles, Cal.

The yeggman knows there are TWO *doors—*

So he looks for a softer job.



Diebold Two Door
Burglarproof Chest
For Oil Stations.

Takes Class "E" Mercantile Burglary Insurance Rating — The Lowest Obtainable

The yeggman knows his job. Usually he is a specialist. "Experts" in oil station holdups know how the cash is protected. When a member of this gentry runs up against a Diebold two-door burglar proof chest *he knows* ———

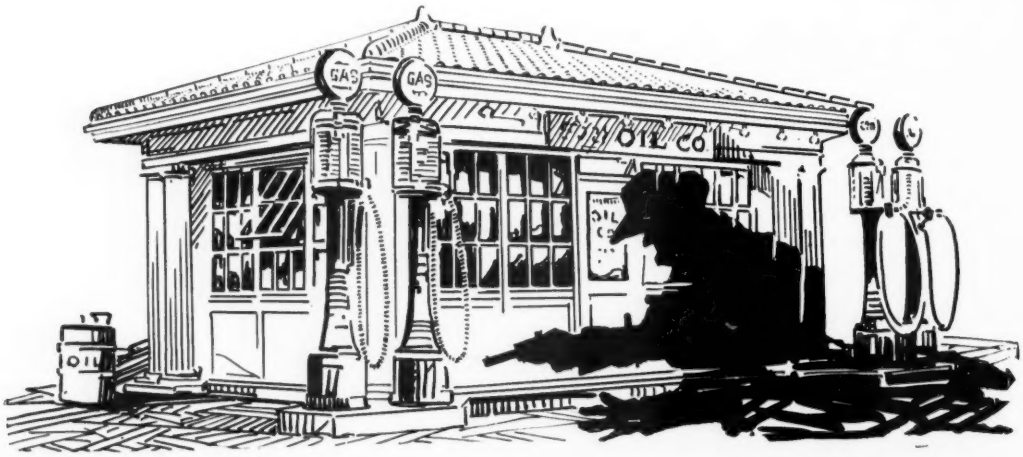
1. That it can't be blown.
2. That it can't be jimmied.
3. That it can't be carried away.
4. That the *inside* door protects the real money.

and that the attendant himself doesn't know the combination of the *inside* door.

No self respecting thug is going to waste his time forcing the attendant at the point of a gun to open the *outside* door because only a small amount of cash is kept there. The would-be robber knows that. That's why he passes on to an easier job. The company keeps its funds and the attendant keeps on living. Can we send a protection specialist to talk about your requirements?

THE DIEBOLD SAFE & LOCK COMPANY, Canton, Ohio

Branches:
New York, Omaha, Boston,
Cleveland, Detroit,
New Orleans, Chicago,
Pittsburg, St. Paul.



DIEBOLD SAFES

Slipping, Mashed Fingers, Burns, Strains Are Major Accidents at Stations

Staff Special
CHICAGO, Oct. 22

SAFETY as an organized movement at service stations and in other branches of the oil marketing business is comparatively new. As far as the records showed at the recent meeting of the National Safety Council in Chicago, few companies have carried their safety movement to this branch.

Marland is among the first Independent companies to put a full-time man on the job of promoting safety in the marketing division of the business. Earl M. Hearne has been at the organized effort for less than a year and, although he has succeeded in reducing the frequency of accidents in his department, he is unable to point out absolute cause and effect data. The main thing is that Mr. Hearne has given the matter more than a year's careful study and he knows where the accidents take place and how.

According to information he has gotten together the most grievous accidents to life and limb that inflict themselves upon the marketing branch of the oil industry occur at the bulk station and warehouse. Accidents most costly in equipment and material develop in the operation of trucks.

The most surprising information is that the filling station is where most of the accidents occur. More than half of the oil marketer's accidents in the form of personal injuries happen at the filling station, Mr. Hearne believes.

Remedies for all accidents are of two general classifications, in the oil marketing business as elsewhere, he says; the preventative measures which the management must take, and those that the employee himself must use.

The most fruitful source of accidents at a filling station is slipping. Service station salesmen have to be fast on their feet or they are not qualified for the job at all. They must move around and they need footing. The rule with reference to slick pavement is to sweep snow off as long as it is possible; put salt or sand on ice as soon as it develops and scoop it away as soon as possible.

Next comes mashed fingers. He does not believe, however, that this is true with all oil companies for it can be avoided, and is being avoided by Marland men now. When the company suffered so many mashed hands, it has just inaugurated windshield service. The service station man, anxious to give service, jumped to the customer's running board and began polishing glass with a cloth in his right hand. With his left he held to the facing of the car's open door. Often when the customer climbed into the car he closed the door on the salesman's fingers, causing the sharpest kind of pain and sometimes two or three days off from work.

Marland men also have suffered painful burns about the neck and face while giving water service. This usually happened when a customer drove in for water and nothing else. If he wanted gasoline he stopped his motor but if he only wanted water he was permitted sometimes to keep it running. With the motor running the attendant could not always hear the water boiling in the radiator. Taking off the radiator cap, ready to look in, the man's face sometimes was caught in a spurt of steam.

Overcoming this has been largely a matter of training. The service station salesmen were shown that it was not necessary to look into the radiator. They can remove the cap from a safe distance and not burn a finger. Now customers are asked to stop their motors before receiving any service whatsoever.

By giving instructions as to stance in the water service another source of accidents was safeguarded. The men were taught not to rest against the bumper of a car but to stand on their own feet and in a position to get in motion quickly. Leaning both knees against the bumper of a customer's car has not caused many accidents but in a few cases the machine has been started up, catching the attendant off his guard and spraining a knee. Mr. Hearne could see the possibility of a dislocated patella which often results in a stiff leg for life.

THE air service also has its hazards. One service station man sustained a broken leg and another a broken nose while putting air in customers' tires. In both cases the wheels were of an old fashioned kind, a model where the tire is held in place by a ring of triangular steel rod, and the ring held on the rim and against the tire by lugs.

In both instances the lugs were not adjusted as they should have been. The car owner had patched his tube at home, put it in the shoe somewhat carelessly and come to the station for air. Before reaching the desired pressure the lugs gave way and the steel ring flew wild.

Now Marland men are taught to keep their faces out of the way when giving air service, also their arms and legs as far as possible. Before they begin giving air service they are instructed to size up the situation and see if the wheel looks safe, especially on spare tires which have little or no air pressure in them and may have gone through the shop of a novice.

Chief among the service station hazards is the drain pit, Mr. Hearne thinks. Crank case drainings are as flamable as gasoline and motorists have to start their motors to drive off. In one instance a Marland man got the shoulder of his uniform coat saturated with drained oil by accident while in the pit and the motorist did not heed his request to let him out of the pit before starting the motor. Backfire ignited the salesman's clothing and he narrowly escaped serious injury by having presence of mind to squat in the pit and smother out the blaze instead of trying to run to help.

THE pit was perfectly clean and the man had a comparatively dry cloth but those advantages do not always exist, Mr. Hearne points out. "A drain pit should have a way of escape at either end for a fire is possible at either end of an automobile and in no case does the man under it want to go through the fire or wait for help in an oily prison."

First aid kits are kept at all Marland service stations and the men are taught to use them correctly, either upon their fellow workmen or a customer who comes in and is in need of immediate attention.

Personal injuries at bulk plants are usually of a more serious nature, although not so numerous. They usually happen in the handling of oil drums and other heavy package goods. They are ordinarily in the form of strains from lifting or bruises and mashes from awkward handling of burdens.

Safety work at the warehouse is more a matter of training than anywhere else. Men are taught how to take hold of a barrel to roll it or to end it up, so as to keep their feet and hands in the clear in case of a slip. They are taught also to keep exposed nails entirely out of reach of men at work.

Company management assumes the greater share of responsibility in keeping truck drivers safe from injury. The management can not prevent collision in traffic but in almost every other particular the safety of a truck salesman is made easy. In every sales division a specially

TO FIT THE PURPOSE
A CHOICE OF TWO GOOD TIRES

In Fisk Truck Tires, both Solid and Pneumatic, are exclusive Fisk details which combined with the accepted standards of construction, give to Fisk Tires a reliability and long term service appreciated by owners and drivers of tank trucks.

The Fisk Transportation Cord Features: The tough, heat resisting Tread. The "Fillerless" Cord Construction (a patented Fisk Process). The multi-cable bead (original with Fisk).

The Fisk Giant Non-Skid Cushion Features: Each button an individual shock absorber. Deep Tread Design gives real non-skid protection. Shoulder Depressions increase traction and provide ventilation.

THE FISK TIRE CO., INC.
Chicopee Falls, Mass.

FISK TIRES

trained man is assigned to make a monthly inspection of rolling equipment. Thus breaks are repaired before they occur and many accidents from actual failure of machinery are prevented.

Every truck is kept constantly in good working order. Brakes are watched particularly. They are always working on a Marland truck and if the driver hits something he should not hit he can not blame the accident to brake failure. Lights also are kept in condition for safe night driving.

To prevent fires from static electricity, Marland trucks recently have been equipped with effective mechanical grounding devices. The truck tank is grounded to the frame and the frame is equipped with a copper lug which the driver must keep polished and clean all the time. Well-grounded wires are installed at all points of loading and unloading and before either operation is begun the ground wire is connected with the copper lug on the frame with a standard battery connection. These are so arranged that they will not be hurt if the driver happens to forget about it and drive away without disconnecting. They pull apart without damage to either connection.

Schools for drivers in accident prevention are held by Mr. Hearne from time to time, and the truck salesmen are acquainted with rules of ordinary precaution and more. They are instructed to stop before driving onto a grade crossing. They are taught to look carefully before backing out from a curb where they are parked, into traffic. And they are instructed in precise methods of signaling for turns etc.

To Have Freight Bills Audited

DES MOINES, Ia., Oct. 22.—An audit of freight bills by members of the Iowa Independent Oil Men's Association during the past three years will be made by a freight expert as a new service for members, according to "Independent Topics", the association's official bulletin.

The auditor will retain 50 per cent of the amount actually collected on any overcharges he is able to discover. Outside of that there will be no charge for the service, according to M. L. Long, secretary of the association.

ST. LOUIS, Oct. 22.—Allison Grant Golden and Grant Allison Golden, twin boys, were born on Oct. 9 to Mr. and Mrs. T. M. Golden.

Mr. Golden is assistant superintendent of the Lubrite Refining Co. here. He says "they are Lubrite products".

NEW YORK, CITY—Charles C. Phelps, combustion engineer, has moved his offices from Paterson, N. J., to room 528, 30 Church St., New York.

Cause of Fire in Cracking Still Explained

FIRES in cracking stills are always a hazard in a refinery using a cracking plant and sometimes they are disastrous. So important is the prevention of fire in such equipment that it seems that when an exact description of causes leading to such a fire is given out, it could be read with interest and profit by every refiner.

There was a fire some time ago in a Jenkins cracking still at the plant of the Golden Rule Refining Co., Wichita, Kan. Engineers of the Graver Corp. and the Jenkins Petroleum Process Co., explain the fire as follows:

"The still had been taken off stream and the fires drawn. It had not been pumped out and there was approximately 100 pounds pressure on the still.

"In ordinary operation valve A to the cooler box E is always open except when charging the still. Valves B, C and D are closed. To dump the still, valve B is opened and the pressure on the still is sufficient to force out most of the oil from the still through the pump out line F to the cooler box E and then to the fuel oil run-down tank. Since the pump-out line is connected to the rear transverse drum G at a point above its lowest point, some oil remains in the bottom of the drum. For this reason, an auxiliary 2-inch line H is connected to the bottom of the drum to insure complete draining. This line sometimes becomes coked and so is provided with two bull plugs J and K for cleaning.

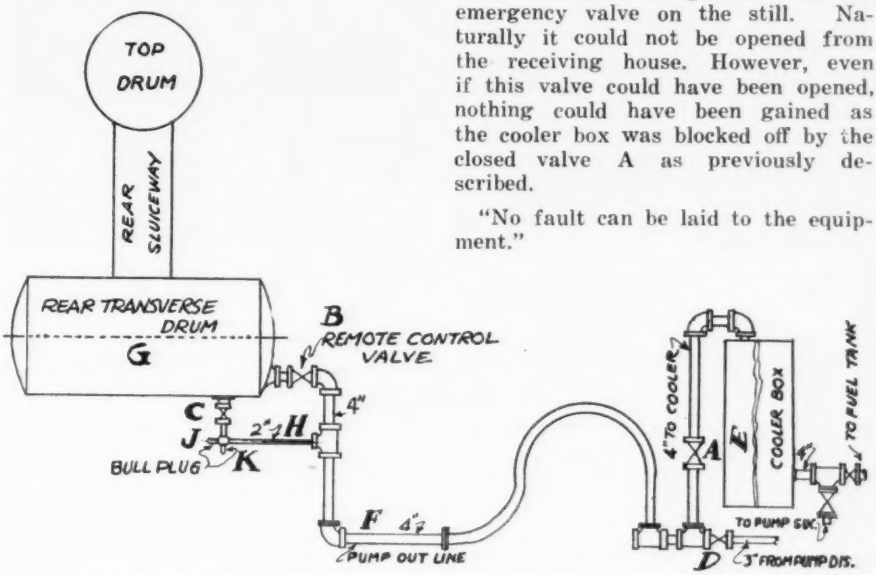
"The conditions at Golden Rule just prior to the fire were as follows: Valve A was open and valves B, C and D were closed. On previous shut downs, the small amount of oil left in the rear drum had to be baled out as the line H was coked.

"The fireman decided that it was too much trouble to bale out the back drum and figured that if he took out the bull plug K and cracked the valve C he could stick a wire up through the valve, loosen the coke and then shut the valve quickly before anything could happen. By opening this line the still would drain completely.

"The bull plug was removed and cold oil came out of the line. Evidently the cooler box had not been pumped out thoroughly the last time the still was down and the oil ran back and naturally spilled out on the ground when the bull plug was removed. So the fireman closed the valve A thus shutting the contents of the still from the cooler box even if valve B were opened. This stopped the rush of cold oil. He then cracked the valve C slightly and rammed a wire up through the line H and broke through the coke. Naturally before the wire could be withdrawn and the valve C closed, the oil, at a temperature about 700 Fahr. and under a 100-pound pressure, came through the line, hit the air and flashed. There were approximately 150 barrels of oil in the still and the fire lasted well over two hours.

"Due to the fact that the oil was coming out of a 2-inch line under 100-pound pressure and the direction of the wind, valves B, C and D were caught in the fire area and could not be reached. Valve A is fitted with a remote control device which is operated from the receiving house. This valve is supposed to be inspected after each run because a small deposit of coke is sufficient to prevent the complete closing of the valve. Some time ago this valve evidently became dirty for some reason or other as the stillmen said the valve could only be closed completely by using a wrench. The valve was never cleaned or repaired but pulled up everytime with a wrench even though this was the emergency valve on the still. Naturally it could not be opened from the receiving house. However, even if this valve could have been opened, nothing could have been gained as the cooler box was blocked off by the closed valve A as previously described.

"No fault can be laid to the equipment."



Valves and Piping in Fire Area, Jenkins Cracking Still, at Golden Rule Plant

Attractive

MILLIONS are being spent to make filling stations attractive — to bring the motorist in to the station.

That's where Air-Scales fit in. Their attractive appearance invites their use by the motorist, while the speedy, accurate, automatic free air service they render brings motorists back as steady customers for your gas, oil and lubricating service.

But their attractiveness is just one of the reasons for installing Air-Scales. Write us today for the complete Air-Scale story and information on the various models for out-door and in-door installation.

See our display at the West Baden Convention.

The Air-Scale Company,
802 Broadway, Toledo, Ohio.

NEW AND IMPROVED
Air-Scales

BETHLEHEM
WAX PLANT EQUIPMENT

Filter Presses — *Wax Moulding Presses*
Wax Distillate Chilling Machines — *Scale Wax Cooling Drums*
Wax Testing Presses — *Paraffine Wax Sweater Plants*
Complete Wax Plants designed and built
Pumps, Stills, Towers, Condensers and other Oil Refinery Equipment
Oil Burning Systems — *Complete Power Plant Equipment*

BETHLEHEM STEEL COMPANY, *General Offices, Bethlehem, Pa*
District Offices
New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco
Los Angeles Seattle Portland

Grayson County, Texas Tests Watched

HOUSTON, Oct. 20.—Two tests drilled for oil in Grayson county, roughly 65 miles north of Dallas, are attracting attention to a part of Texas hitherto non-productive. In one of these tests, No. 1 Wall of the Simpson-Fell Oil Co., of Ardmore, upwards of 10,000,000 cubic feet of gas daily has been obtained. The other test, drilled by G. A. Tucker on Thorn & Hardy fee land, had a show at 2775 feet that appeared to be asphalt.

The Simpson-Fell test, in the Reeves survey, which developed a flow of 500 barrels of salt water with the gas at total depth of 2515 feet, was plugged back to the 1300-foot level, after which the gas flow appeared stronger than at first. An oil pay considered too small to test was passed up last June at about 887 feet, probably at the base of the Trinity formation. At 903-908 feet, a formation resembling granite wash and called the Arbuckle sand by the drillers, was logged. Another slight oil show was found at 919-921 feet, after which the drill went into lime formation for about 200 feet.

The Thorn & Hardy test, in the S. Stewart survey, abstract 1096, has been in more or less grief for some time past. At 2740 feet, a slip was lost in the hole. This was cored out with a smooth-faced core-barrel by use of a melting process between the tempered steel of the slip and the wrought iron of the core-barrel. It was the second well on which Tucker had accomplished a similar feat. The core-barrel, after being heated red hot, welded oversize clamping down on the lost slip and closing with the weight of the drill pipe made a successful fishing job possible.

After completion of the fishing job a core of sand from 2775-2790 showed streaks of what appeared to be asphalt, although scorching of the top of the formation sample may have been responsible. After setting and cementing casing at 2775 feet, the test was drilling ahead at 3010 feet at last reports.

LOS ANGELES, Oct. 22.—Olie Olson, one of the best known scouts in California, connected with the California Petroleum Corp. for the past seven years, has resigned to go with the Elwood J. Munger Oil Information Service. This service is the only one of its kind in California and has the confidence of the important oil companies of the West Coast, having been established several years ago by Elwood J. Munger, who had been in the employ of the Union Oil Co. several years prior to that time.

Wide Variety of Design Major Difficulty In Oil Well Pumping Field

By H. E. Cassidy*

THE problems which face the oil field operator today in the pumping of oil to the surface are closely allied with the efforts of the manufacturers of pumping equipment to produce products which will deliver efficient service under constantly varying conditions.

For the reason that the author of this article is connected with the manufacturing side of pumping equipment and the servicing of the same in the fields, the subject will be approached from a manufacturing standpoint.

First, let us briefly consider just what conditions enter into the efficient operation of a plunger pump and rod string. First of all is the submergence of a pump, but it is usually desirable to secure the maximum head of oil on the standing or check valve without subjecting the pump to the danger of "sanding up." Upon the fluid level and the pumping stroke is based the pumping rate. Add to these things gas, sand and water problems, rod stretch, tension and vibration, the static and dynamic forces involved in pumping, and a fair idea is obtained of production troubles.

Problems today as compared with those of 15 years ago are wholly dissimilar. In 1910 and 1912 wells running over 1500 to 2000 feet in depth were unusual and considered deep wells. Today plunger pumps are operating to as great a depth as 5200 feet, producing from six to ten times as much oil as was formerly being pumped at 2000 foot depths. This has been made possible, primarily, by the higher standards of machining on pump fittings, improvement in casing, steel and similar materials, and design of pumps and sucker rods themselves.

The deeper the wells are drilled, the more problems are encountered. Viscosity and temperature of oil, together with the tendency to find floating sand, are much more of a problem at 5000 feet than at 500 feet. All this has a direct reaction on the production of pumping equipment. The producer calls for equipment which will stand the gaff under heavier and increasing loads. Equipment must be had which will perform the duties never before considered possible. A desire to serve, plus the necessity of keeping abreast with competition, forces the manufacturer to double and redouble his efforts to furnish satisfactory equipment.

One of the real tragedies attendant upon the improvement of pumping equipment is the constantly increasing number of pump fittings. Differently shaped fittings, machined from various kinds of material, are constantly added to a standard line because this type of equipment has proven advantageous on one or more leases. Oil field operators cannot realize what stages this varying design of fittings has reached. One concern manufacturing pump fittings now carries on hand a stock of 96 different cage sizes and types, with approximately 900 substitute coupling sizes.

The burden of this lack of standardization cannot be borne by the manufacturer alone, and the users of pumping equipment will have to stand their share. The recent work of standardization committees should do a great deal to alleviate the situation, but the real difficulty lies with the users of equipment themselves, who are never satisfied with a standard line. True, certain improvements may be evolved from this chaotic variance of fitting designs, but the percentage of improvements developed independently in the field has proven to be very small.

MANUFACTURERS are making every effort to keep abreast of the times in the production of their equipment. The engineering staffs keep constantly in touch with conditions in the field and attempt, in a scientific way, to aid in solving the everyday pumping problems. At the same time trained metallurgists are employed in plant laboratories, carefully testing and checking the physical and chemical analysis of all incoming shipments of steel and cast iron. Whenever a product fails in the field, due to faulty materials, the metallurgical department attempts to discover the reason for the break and, thru a different application of heat treatment or change in physical properties, to produce better products.

Prior to the last four or five years no effort was made to discover what was wrong with a product that failed. In the field, when something broke, the user declared that such-and-such a concern was carrying a poor grade of supplies, and refused to purchase from him further. This hasty condemning of manufacturing was by no means correct and this can hardly be called fair. Many times the article of equipment failed because it was used for something for which it was not primarily designed. Again, structural design or faulty materials may have been to blame.

Today when something breaks, the user is furnished with a detailed report, explaining how and why. If it is his fault, he is so informed and the manufacturer's representative has a concrete and authoritative report to back up his statements. If, on the other hand, the fault lies with the manufacturer, the user of the equipment is told just where the trouble lies, a replacement is effected, and an effort is made to prevent a recurrence of the same trouble.

The development in working barrels during the past 20 years is the result of better materials used in their manufacture, better workmanship and improved designs. While an oil well pump must necessarily remain, fundamentally, a volumetric displacement device, and therefore retain certain elements subject to wear, there has been presented to the trade numerous outstanding improvements.

Pumping oil is merely a matter of suction and expulsion. American wells use what is known as the simple displacement pump in raising fluid in the well to a surface level. A plunger equipped with a working valve draws the fluid into the pump cylinder or working barrel, where it is forced upward by a vertical reciprocating plunger motion.

IN THE conventional cast iron cylinder type, the solid cast iron barrel was not feasible from the standpoint of accurate machine work. To bore a hole in a casting five to seven feet long to a limit of one quarter of one thousandth of an inch variation in diameter and at the same time straight enough to allow free reciprocation of a 48-inch plunger of a diameter one half of one thousandth of an inch less than that of the cylinder bore, led to the development of the sectional liner idea. The shorter sections, or liners, permit of extreme accuracy and when assembled in the pump body, present an accurate, uniform and highly finished encasement for the plunger.

Of equal importance in pump performance is the plunger. Plungers are accurately ground on cylindrical grinders to remarkably close limits. When we recall the primitive machining methods of turn-

*Research department, D. & B. Pump & Supply Co., Los Angeles. The author wishes to acknowledge indebtedness to H. L. Miller, chief metallurgist and E. E. Stevenson, mechanical engineer, with same company, for assistance in compiling data contained in this article.

ing, filing with a mill file and finishing with emery cloth, we cannot but conclude that the newly finished pump of 20 years ago, at its best, would not equal the average discarded pump of today after several months of service.

Pump plungers are commonly straight steel cylinders of lengths ranging from 50 inches to 72 inches and approximately one-fourth of an inch in thickness, highly polished on the exterior surface and finished to give a close fit with the inside polished surface of the working barrel. To obtain a fit which is within a quarter of a thousandth of an inch, the liners are lapped and the plungers ground.

Two other types of plungers are used wherever conditions merit their installation. For shallow well service, the plunger may be made up of leather or composition cups mounted on a steel body or extension sleeve. The second type of plunger uses leather cups mounted on an extension sleeve with short steel stub plungers between and are known as combination plungers.

The plunger conforming as it does to the working surface of the cylinder with an accuracy of a quarter of a thousandth of an inch, must be sufficiently easy of operation to avoid friction heating and tight enough to prevent fluid slippage under a pressure averaging from 500 to 2000 pounds per square inch.

SHALLOW wells work best with easy fitting pumps, while deep wells are just the contrary. Oil pressure from the fluid column in deep wells distorts the plunger in the working barrel and is one of the first difficulties encountered where oil is raised above the 3000 foot level. This oil pressure developed between the plunger and the barrel by a static head of 4000 feet of oil in the tubing would be about 1600 pounds per square inch, a pressure sufficient to cause noticeable compression of the plunger and expansion of the working barrel, thus increasing the clearance and inducing oil leakage. This condition is overcome where the working valve is placed at the bottom of the plunger instead of the top, or where a working valve is used both at the top and bottom. Where this is done, the oil pressure will be applied within the plunger with the expansion of the plunger cylinder, thus giving a tight fit against the liner surface. This fact suggests the use of a loose fitting plunger that will offer little resistance on the downstroke and that will be expanded by the pressure of the fluid column to a tight fit on the upstroke.

Ground temperatures of depths of 4000 to 7000 feet are much greater than normal atmospheric temperatures. These temperatures commonly vary from 125 degrees to 175 degrees Fahr. in deep wells with the result previously mentioned. Where this condition exists, only experiment can give the correct clearance space needed. Too great a clearance will of course result in plunger leakage, while a decreased space may throw additional friction load on the sucker rods and where the plunger binds, the rods may part.

The efficiency and capacity of the pump is largely determined by the rate of plunger travel. An upward plunger displacement of 120 feet per minute will lift twice as much oil as would be pumped with an upward plunger travel of 60 feet per minute.

THE rate of plunger travel determines the amount of resistance offered by a standing valve to the upper passage of oil into the working barrel. The resistance to flow offered by the valve increases proportionately as the plunger speed increases with its resultant effect on oil flow. For that reason, as the plunger speed increases, greater submergence is necessary in overcoming resistance offered by the valve and forcing the oil to fill the full fluid space. In order that the full amount of oil needed will enter the working barrel, it is necessary that a definite rate of plunger travel be determined on.

Naturally, so vital a production unit as the pump has afforded an opportunity for countless ideas on pumping, differing from the conventional and accepted methods. Practical use has eliminated all except those based on actual economic need. For instance, cups, or combinations of cups, and short plungers are beneficial when the ordinary plunger pump will not function, due to unusual sand conditions. In addition to alterations in detail arrangements of plungers, cups, working valve location, development of alloy steels and bronze metals to meet acid conditions, there have been developed pumps of such construction that the entire working parts can be run into the hole on the sucker rods. Obviously the fact that an entire pump can be removed and reinstalled without the necessity of pulling tubing is a decided advantage under some conditions.

Thus we have established three outstanding tried and proven types of plunger pump—namely, the sectional cast iron liner pump with the straight plunger, the cast iron liner pump with a plunger consisting of cups or cups in combination with short sections of steel plungers, and the 'pull-out' pump, which is necessarily a steel tube lined pump with cups. The first two types of oil well pumps are subdivided into three, which cover practically every condition with which an operator will come in contact. These types are number 1, in which the standing valve drops into the shoe already attached to the shell—number 2, in which, by use of a nipple and long steel extension shoe, it is possible to note the fit of the standing valve and—number 3, a jacket pump designed to give maximum production in wells where gas may be present. We may now consider, in detail, factors entering into satisfactory pump service as seen from the standpoint of the production man.

In the first place, the pump manufacturer must establish and maintain sizes and fits that assure ready replacement of worn working parts in the field shop. The design of all parts must be such that all possible strength is developed in the limited space available, and the pump must not fail because of any structural weakness. The advantage of experience must be reckoned with as experience, as it presents and consequently solves countless unthought of problems in the primary conception. In this category may be listed proper valve areas and cage lengths, correct fit allowances, satisfactory heat treatment of highly stressed parts, and cup composition. The present day production man benefits, unknowingly perhaps, from thousands of experiments on the part of the experienced pump manufacturers, at no expense to himself, they merely being passed to him as a part of an article of merit. He expects and accepts, as he should, these as his due right. So doing, he is accepting the skill of men who have devoted years to hunting out and overcoming problems that, left unsolved, would have increased production costs to an untold amount.

INASMUCH as the art of pump making has been progressive development, it follows that the pump manufacturers must be ever alert for departures and refinements. Yet, his products must maintain a conservative attitude to the extent that the production man is not made to pay for too much haste and waste in trying out undeveloped equipment.

Pump volumetric efficiency is affected by two important factors—namely, faulty valve action, and the presence of gas. The influence of faulty valve action and construction is best evidenced by restricted passageways and too long cage body, combined with a pronounced ball shielding condition formed by the top of the cage.

It is impossible to conceive 100 per cent efficient valve action. An appreciable amount of fluid will pass back to the lower chamber as the plunger changes direction of travel. To minimize this condition, the ball freedom should be restricted in a correct valve as to vertical movement and guided by close fitting cage wings to insure certain seating. In addition to this, the ball should be prevented from "balling up" or sticking to the upper cage portion by a small area contact point in such a way that a large part of the upper surface of the ball will be subjected to fluid pressure. The reason for these precautions is to cause a more rapid seating of the ball and thus

PENFLEX Gasoline Hose

—**"the live hose"**—a new hose that everyone has long waited for!

The instant you pick up a length of **PENFLEX** you will be surprised at its "lively feeling"—a certain live flexing action to your handling that has never before been found in gasoline hose.

When attached, to the pump or tank wagon faucet, it will flex and give readily to the slightest pull—*no tugging—no straining—no jerking.* It will follow your arm movement like a piece of string—yet it has the strength and lasting qualities of steel.

What makes this "live, free, easy flexing action" possible?

It is a new and perfected **PENFLEX** "4-point" construction — there's something different about it—a something *new* that you should know before you buy your next length of hose. It will save you money!

Get the facts ~ now ~ write for Bulletin No. 53C and attractive discounts!

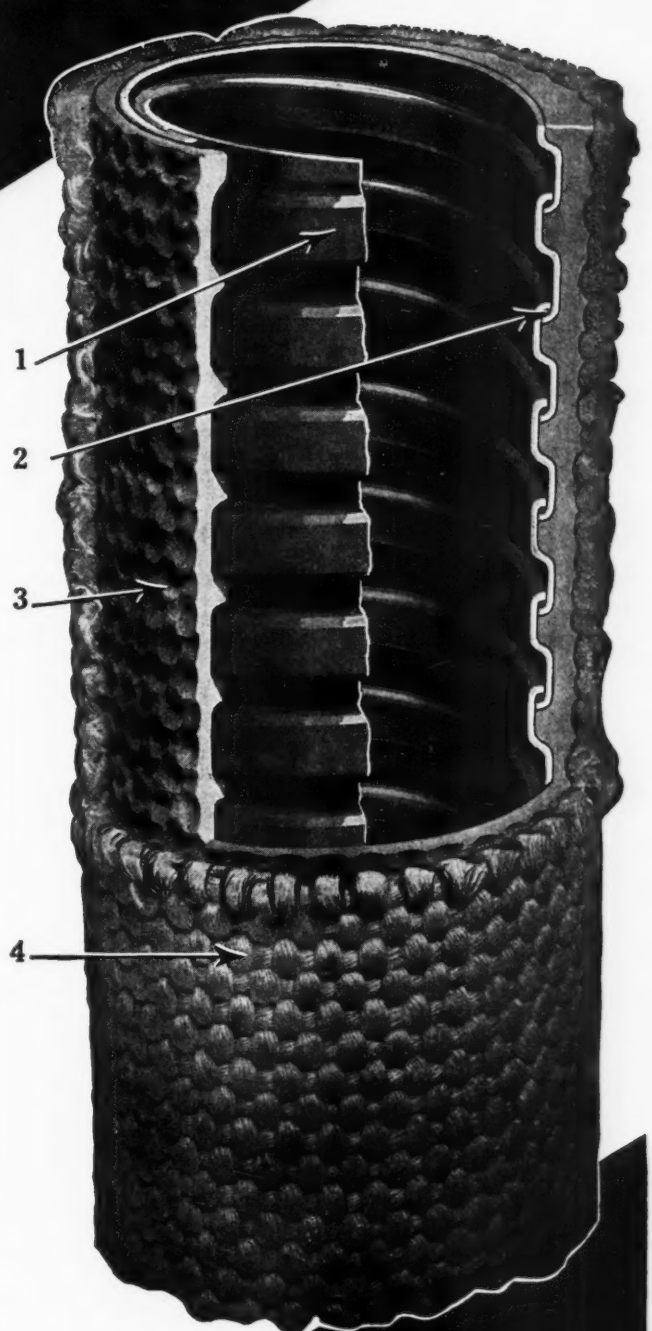
PENFLEX is fully guaranteed—subject to a life-long free service——it is "non-static" and listed as standard by the Underwriters. Built in all sizes and serviced and stocked thru-out the country.

PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.

PHILADELPHIA, PA.

Branches and Warehouse Stocks at

CHICAGO — NEW YORK — BOSTON — NEW ORLEANS
HOUSTON—LOS ANGELES—SAN FRANCISCO—SEATTLE



because it is live hose it lasts longer

Treating Plant Quickly and Cheaply Installed

Using equipment already on the lease, you can soon arrange a plant for treating any quantity and any variety of "cut oil" with—

Tret-O-Lite

There is no heavy investment. Sufficient treating capacity for flush production does not penalize the operator at a later period.

WM. S. BARNICKEL & CO.
St. Louis, Mo.

Tret-O-Lite

Professional Card Directory

McCARRON AND ROSENBAUM
Attorneys and Counsellors at Law
Specializing in all Branches of Corporation and Commercial Law—Reorganization.
Trial Practice in all Courts, State and Federal.
Guarantee Title Bldg.—Cleveland, Ohio

S. F. SHAW
CONSULTING ENGINEER
301 Terrell Road San Antonio, Texas
Organization of Air—Gas Lift Departments and Training of Engineers for this work.

L. G. Huntley J. R. Wylie, Jr.
Shirley L. Mason
HUNTLEY & HUNTLEY
PETROLEUM GEOLOGISTS AND ENGINEERS
Frick Building PITTSBURGH, PA.

check the return of the fluid to the lower pump chambers.

The seats used in pump valves must necessarily be of the very best material obtainable, otherwise the constant hammering of the ball would soon develop crevices which would allow fluid slippage. The oil is required to change its direction of flow abruptly when it strikes the valve and in addition the seat also forms an obstruction in the oil channel. These conditions are conducive to what petroleum engineers term turbulence, and offer considerable resistance to the flow of oil. Oversize standing valves, using larger seats and bigger recesses above the valve are to be recommended.

To eliminate gas lock, or the condition caused by gas accumulation in the pump barrel below the plunger, the volume in the suction chamber should be reduced to a minimum. This is accomplished by using a lower plunger valve and spacing as close to the standing valve as is practical.

Various forms of plunger bottom valves may be used in combatting gas compression between the valves. A standing valve in plunger attachment may be used to advantage in both upper and lower valves. A variation in type of seats is sometimes advisable and is recommended wherever conditions may warrant.

When the downstroke of a pump is completed, the oil below the working valve is temporarily at rest. As the plunger rises and the valve opens, the inertia of this oil must be overcome and the oil moved at the same velocity as the plunger. The restriction at the standing valve seat and the plunger nut surrounding the garbutt rod necessitate a much more rapid acceleration at these points. Substitution of a gas valve and standing valve puller for a garbutt rod attachment brings the two valves as near together as possible and reduces loss of static head in the pump valves at the conclusion of the down stroke. With no garbutt rod to hinder, the plunger may be spaced as far from the standing valve or with as long a stroke as the length of pump permits. In placing the ball and seat in the plunger as close as possible to the ball and seat in the standing valve cage, gas pockets which retard production are done away with. The plunger should be operated so that the two valves are as close together at the conclusion of the down stroke as is possible without the bottom of the working valve's striking the top of the standing valve.

A GREAT deal of benefit is derived by a certain modification of the pump barrel which allows a large percentage of the gas to escape to the casing before the fluid enters the pump. To accomplish this, ports are provided thru the pump shell near the upper collar with a passageway to a point below the standing valve formed by the outer shell and the cast iron liners. One or more lengths of tubing with the lower end closed with a plug or an automatic sand dump valve to form a depository for the settlement of floating sand are used below the pump. This arrangement prevents the gas from entering the pump and is a positive preventative of gas troubles.

The outside diameter of this type of pump is no larger than the standard type and presents no unusual condition or requirement.

The idea of "follow-up plungers" has been made possible by the high standard consistently adhered to in maintaining sizes of liners and plungers. In this event, the pump user may follow a worn plunger by a new one of an increased diameter sufficient to compensate for the wear. He is assured of different sizes to a fraction of a thousandth of an inch by means of extreme accuracy in gaging and the marking of same on each individual plunger. In this way, it is sometimes possible to obtain three or four times the ordinary wear from a pump for the cost of the new plungers.

It will be of interest to note that the liners are considered the standard of absolute size and that all degrees of pump fit are governed by a plunger diameter differential.

The efficient operation of an oil well pump is possible only by taking into account the type of well in which it is to be used, then selecting a pump that will meet the requirements involved, and operating it with both the well's peculiarities and the pump's specifications in mind.

A pump placed 1000 feet down requires a certain amount of strokes to bring the oil to the surface. From that time on the flow is practically continuous, though it may take the oil an hour or more to travel from the pump to the surface. The same is true of a 4000-foot well, though the fluid may be on the way a couple of hours.

FOR pumping purposes, the wrist pin is usually carried in the second or third crank hole, giving a 32-inch or 40-inch stroke. Pumping speed ranges from 12 to 25 up and down strokes of the plunger per minute, depending upon the viscosity and density of the oil, depth of the well, submergence of the pump, presence of water, sand or gas and other variables.

Plunger pump efficiencies occassionally are as low as 50 per cent of the theoretical plunger displacement. Sand preventing valve seating or valve leakage is the direct cause of this low percentage.

Pumps should be operated at low speeds, only submerging in heavy viscous oil, otherwise the working barrel will not be completely filled on the up stroke, the efficiency falling off rapidly. Gas in combination with the oil will, however, assist the pump,

so that in many cases the pumps are over 10 per cent efficient.

Where wells make little sand, it has been found that the most suitable place for the pump is just above the top of the pay sand. Pumping oil from a lower level than the pay sand may result in paraffining the sands themselves. Where the fluid column is high in the well, the pump should be several hundred feet in the fluid. With the fall of fluid level, the tubing should be lowered, the pump being kept as high as possible at all times.

The submergence of a pump below the fluid surface in an oil well plays a most important part in obtaining a maximum production of oil. Tests have proven that when insufficiently submerged, a plunger pump will deliver less than half of its theoretical plunger displacement. For this reason it would seem probable that in many cases wells are yielding only half their capacity.

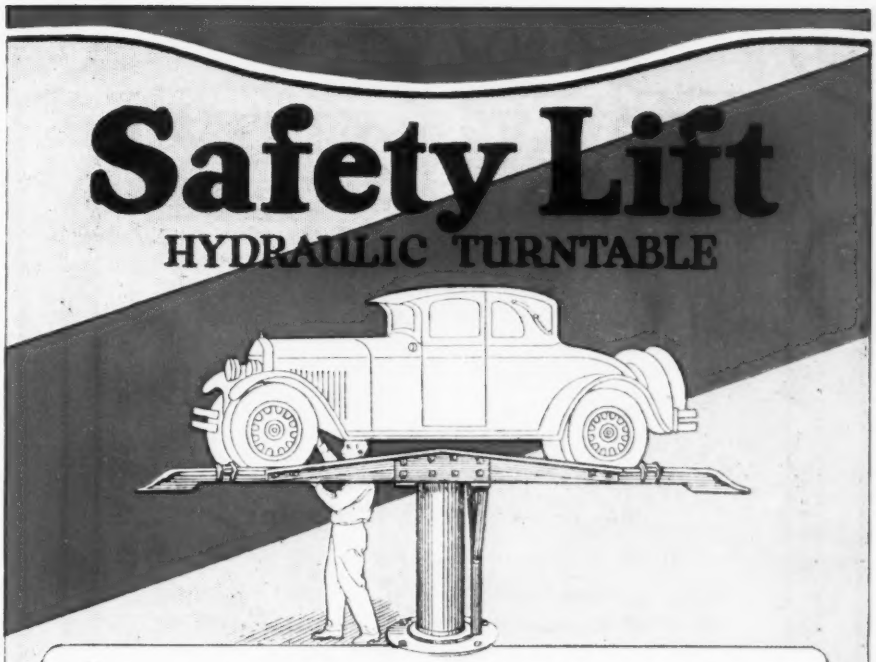
Maximum oil production will be realized with the lowest possible fluid level in the well for the static pressure of the accumulated oil directly resists the expulsive forces within the sand. Maintenance of a high fluid level within the well, however, reduces the flow of fluids and will restrain the admission of water and gas, conserving gas and preventing water incursion.

THE speed of pumping, or revolutions per minute, is a prime factor. At very slow speeds, the inertia of the fluid increases the effort required. At too great a speed, the friction of the pump may cause the rods to cork screw with the result that the working valve only partly completes its stroke. Too much speed also gives a snapping action to the sucker rods that will in time destroy their strength.

In determining the proper rate of pumping, namely, the length of stroke and number of strokes per minute, it is well to remember that the spaces between the valves must be entirely filled with oil on each up stroke of the pump. Where this is not the case, the plunger pounds on the down stroke, forming gas pockets, with a loss of pumping efficiency. Too rapid pumping may reduce the fluid level, encouraging the admission of air or gas in the working barrel.

Pump speed should range from ten strokes per minute for very heavy oil to as high as 20 strokes per minute for lighter oil. With the walking beam, the second hole is used to give a 32-inch stroke, although on easy wells it may be increased to 40 inches. For a 3-inch pump with a stroke of 32 inches, the pump capacity for twenty strokes per minute would be 336 barrels per day, while the 2-inch pump with a stroke of 32-inches would give in ratio 149 barrels per day.

It is advisable to use longer strokes in deep well pumping for the same



Service that builds PROFITS!

Here are actual figures of increased business in an actual service station five months after Safety Lift had been installed.

Greasing jobs increased from 48 to 142 jobs a month; oil changes from 196 to 427 a month.

Safety Lift is SAFE. Its hydraulic action is positive and troubleproof — with an exclusive visible automatic Safety Leg. Safety Lift can be operated directly from your air compressor, without the expensive installation of underground piping or a valve nest box.

Safety Lift pays for itself—you can earn its cost in a few months.

For Visible Lubrication

SAFETY LIFT CO. - 16 Beaver St., - New York

Gasoline And Other Motor Fuels

by Ellis and Meigs, is a book which gives a complete survey of the field and a description of practically every process of making gasoline and most other motor fuels of promise or prominence.

The price of the book is $10. Just send us your check and we will mail a copy of it to you.

National Petroleum News, 1213 W. Third St., Cleveland, Ohio

KANOTEX

FOR WINTER TRADE

60-62 — — 400 Endpoint
64-66 — — 390 Endpoint
64-66 — — 375 Endpoint

—all worthy members of a family of Petroleum products that has made more friends of long-standing, among jobbers, dealers and users, than any other brand on the market today.

KANOTEX
Petroleum Products

are trade builders, motor savers, and money makers. They are sold through legitimate jobbing channels only, and backed by a degree of co-operation to the trade from the refinery that has played a big part in bringing greater success to scores of jobbers and dealers.

Write, wire or phone for a trial car today

THE KANOTEX REFINING COMPANY
Phone L. D. No. 4
Arkansas City, Kansas

Oil Price Handbook

RECENT crude and tankwagon price changes have caused many an oil man to study prices prevailing a year ago at this time.

What was Mid-Continent crude a year ago today? Or, what was 58-60 U.S. Motor gasoline in Oklahoma? Or, the tankwagon price of gasoline a year ago? These are some of the questions you are asking yourself right now.

You can get the answers most conveniently, rapidly and accurately in the OIL PRICE HANDBOOK for 1926. It contains the refinery, tankwagon, crude prices and export markets for the entire year 1926 as published in the weekly issues of National Petroleum News. 146 pages, cloth bound, marginal index—price $5. Send for your copy *today*.

NATIONAL PETROLEUM NEWS 1213 W. 3rd St. Cleveland, Ohio

reason that it is advisable to take longer steps in making a long walk. If one long stroke will lift the oil as far as two short strokes, real economy is effected through the longer stroke. This economy is not only a reduction in the wear and tear on the machinery by half, but also a great reduction in the vibration of the sucker rods, as well as overcoming somewhat the loss caused by the spring of the rods at every stroke. Much of a 24-inch stroke may be lost in deep well pumping thru the spring of the rods, regardless of the sucker rod analysis. If the stroke is increased to 56-inch the same amount of spring will prevail, but the loss of stroke will be reduced greatly.

A long stroke has been found advantageous for pumping wells producing sand, the wrist pin being carried in the "fourth hole." Where a valve has become clogged by sand, it may often be freed by "shaking" up the well, or running the pump at high speed for a few strokes. Sixteen strokes to the minute is the usual pumping rate when the rods drop freely and prevents the sand from settling.

THE speed of operation is affected to a great extent by the length of the stroke. When operating a pump that is close to the surface, the rise and fall of the plunger is practically the same as the rise and fall of the walking beam.

It is quite different when the pump is three or four thousand feet away, as the sucker rod spring, which may only be estimated on account of varying gas pressure, may take up most of the beam motion. The tubing also is elastic to a certain extent, as indicated by vertical wear on pump collars, showing that they have been traveling up and down.

Free movement of sand in the well pocket is beneficial and it should be promoted wherever possible. Removal of the sand will lead to the development of cavities about the well, and shifting. When this occurs, frequent parting, collapsing and bending of oil strings may go so far as to result in actual loss of the well. The difficulty arising from the combination of water and sand lies in the formation of sand bridges. The sand in contact with water does not flow as rapidly as it does when suspended in clean oil, hence water causes the formation of sand bridges, sand packed working barrels and other difficulties serious in nature.

A pumping system for handling sand will be found most efficient if—(1) steel plungers are used instead of leather cups in working barrel (2) if the pump is placed 100 feet or more above the oil sands. Sand decreases production thru the wear on pumps. Clogging of the wells necessitates cleaning operations and time wasted in handling sand on the surface.

Pump size, length and number of plunger strokes per minute determines

the theoretical capacity of the pump. Pumping strokes vary from 12 to 25, the average being 16 strokes per minute. Under average pumping conditions, a 2¾-inch pump, working at a speed of 20 strokes per minute, with a stroke length of 24 inches, will give an ideal daily capacity of about 400 barrels, not allowing for leakage.

WHEN, in 1890, wooden sucker rods were first used in the Pennsylvania fields, California was not even considered as an oil state. At that particular period of California's history, her citizens were most intensely interested in water wells. For that reason, the majority of veterans of today, boys then, saw the first wooden sucker rods used, not in oil, but water wells. The first so called steel or in reality iron rods, were introduced in the east over 30 years ago. It was approximately six years later however, before the steel rod came to be used in California. What is known as the straight western style rod first made its appearance in the Kern river field, near Bakersfield.

The eastern and western straight type rod were so distinctly different that the western rod might be termed a new rod. The eastern rod was constructed by simply upsetting the end of a steel bar in a malleable sleeve, while the western rod was threaded, with no shoulder at the end, and joined by a round coupling or union. The malleable sleeve rod did not prove satisfactory because the constant whip and stress in the well loosened the upset and it swiveled, frequently pulling the box.

The western rod unscrewed so easily at the union that efforts were made to strengthen the connection by cupping the rod ends. This too proved a failure. To overcome these difficulties, the idea was conceived in 1910 that a rod end could be manufactured out of high quality steel, welded by the use of electricity to the rod itself. As far as strength in the pin was concerned, the electric welded rod was in many cases highly satisfactory, but it frequently broke in the welds. It resisted fatigue and had tensile strength, yet the slowness of its manufacture and its weld breaks were points against its use. With this condition existent, it was an easy matter for the upset rod to establish its supremacy over the welded rod when a machine for upsetting rod ends came into common use some nine or ten years ago.

In the present upset rod, rod manufacturers have apparently reached the ultimate in pin design. The relative speed of the upset operation, combined with the durability of the shoulder design in the field, brands the present rod as one which will remain upon the market for many years.

Simply operating the plunger of a pump up and down would not be so difficult, were it not for the snap of the rods at every stroke. A well

In Ship's Hold or Box Car—the NILES "Ringseal" Protects!

EVEN extremes of shipping abuse hold no terrors for the NILES "Ringseal" Steel Container. Whether for export or local shipment, leading manufacturers are finding this the ideal protecting container for every purpose. Its perfect seal is effected with a single stroke—and it opens just as easily. Attractive appearance gives added value for advertising and for that important "first impression."

Send for sample and literature Today!

Ideal for Greases and Soaps

This container is now widely used by some of America's outstanding manufacturers. It is offered in sizes holding from 25 lbs. to 100 lbs. Let us send you a sample container, together with full details.

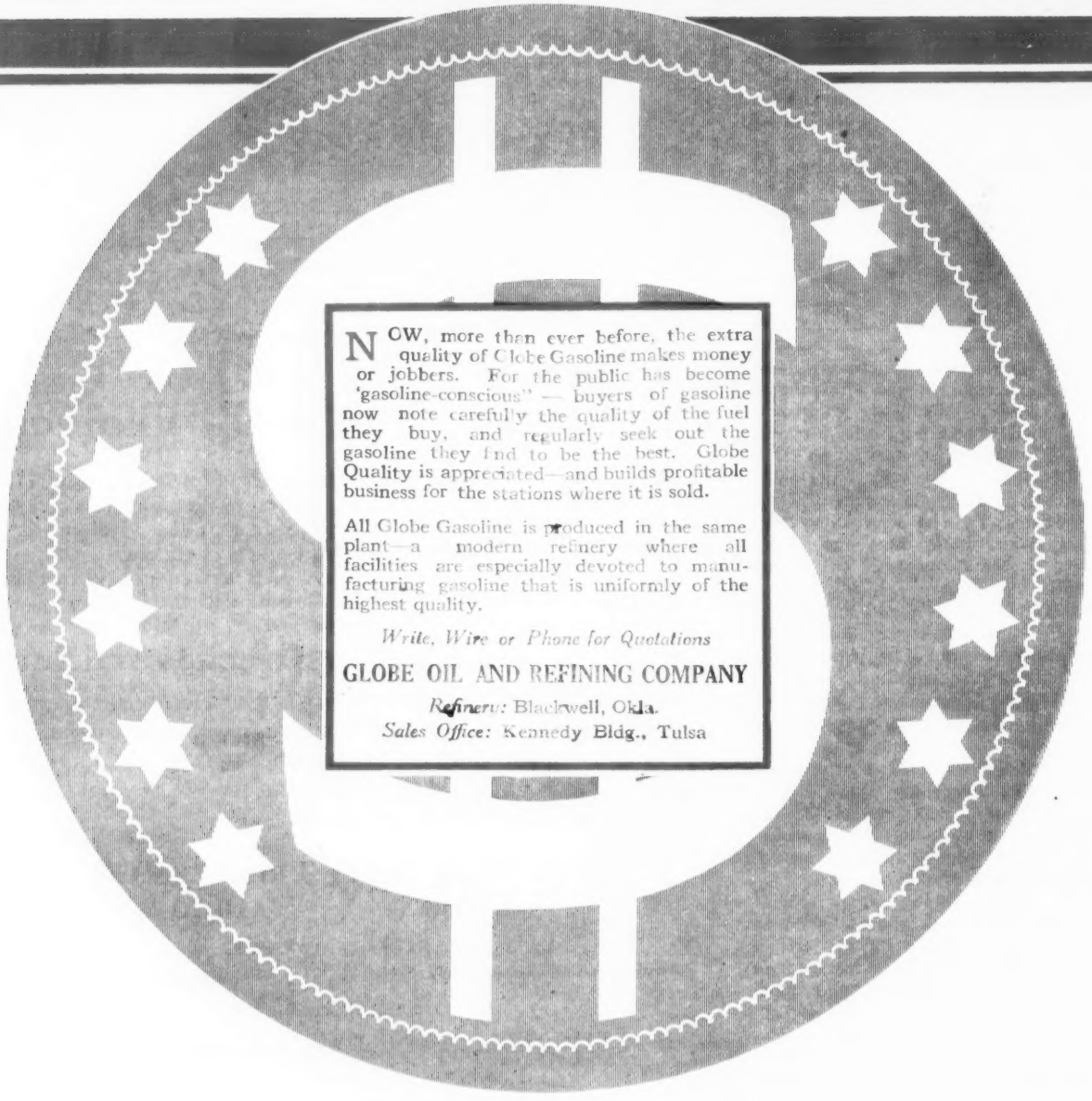
THE NILES STEEL PRODUCTS CO.
NILES — OHIO

NILES RINGSEAL

CLASSIFIED ADVERTISING
will get results for you
no matter what you "want"

Turn to that page, with rates, at back of this issue.

GLOBE QUALITY MAKES MONEY FOR JOBBERS



NOW, more than ever before, the extra quality of Globe Gasoline makes money for jobbers. For the public has become 'gasoline-conscious" — buyers of gasoline now note carefully the quality of the fuel they buy, and regularly seek out the gasoline they find to be the best. Globe Quality is appreciated—and builds profitable business for the stations where it is sold.

All Globe Gasoline is produced in the same plant—a modern refinery where all facilities are especially devoted to manufacturing gasoline that is uniformly of the highest quality.

Write, Wire or Phone for Quotations

GLOBE OIL AND REFINING COMPANY

Refinery: Blackwell, Okla.
Sales Office: Kennedy Bldg., Tulsa

GLOBE GASOLINE

pumping 25 strokes per minute brings the rods taut 36 thousand times per day, and this whipping continues day after day, month after month.

At the instant the upper valve of the pump closes, a stiffening begins in the string of rods that follows up to the polish rod with greater or less intensity, according to the speed of the stroke and the amount of friction in the pump. If the stroke is slow and the friction slight, the steady rise and fall of the rods results in comparatively little strain.

A SURVEY for suitable materials is approaching in a manner similar to the following. Having first determined that the tensile strength must be sufficient to lift the weight of a string of rods 5000 feet long, and a fluid load equal to that on a 2¾-inch pump, we set the tensile strength requirement at that figure, plus all that we can give it after providing for the other factors. Ordinarily, even the maximum load is assisted greatly by gas pressure. As the percentage of water increases and the gas saturation decreases, the load becomes heavier and requires more strength to move it.

Vibration is a factor which can only be taken care of during the process of manufacture. This is accomplished thru the selection of the proper steel. Steel of various analysis is made into test bars which are then placed in a machine constructed to give a continuous vibrating test. After hundreds of snapping, bending and vibrating tests, we are able to select the steel formula having the greatest tensile and vibratory strength.

Possibly steel recuperates some during periods of idleness, but operators do not ordinarily have time or the proper facilities to regularly provide vacation periods for their sucker rods. It is essential, therefore, that the manufacturer "build into" the rods those qualities which it is known will stand up under the most severe service.

The moment of greatest strain on a string of rods is the beginning of the upstroke, and the greatest strain is on the top rods, which have to lift not only the fluid load, but the weight of the rods below. The inertia of this weight makes the start a herculean task, particularly when there is little or no gas present to give the fluid a boost. The result is that the rods will spring and some of the stroke will be lost.

In pumping a well, a certain percentage of the stroke is lost, due to stretch in the rods and tubing, though with an increase of depth the load on sucker rods becomes more severe and rod troubles are increased. This may be traced back to:

First—Rods too small in diameter.

Second—Operating at too high a speed, with the result that dynamic forces are set up, causing the rods to break.

Problems such as have been cited are much more readily solved under the present standards of manufacture. Improvements in forging practice and pin design have been made possible by changes in various upsetting machines. More accurate machining of the threads has been made possible by improvements in thread millers and chasing dies. Those men who will turn back to pages of memory and think how the old time sucker rods were first of all manufactured and, secondly, delivered to the user, will readily grant the tremendous progress made in the production of better sucker rods. Carefully oiled and wrapped ends, gaged for a perfect fit, have effected a noticeable reduction of rod crews and the time devoted by these rod crews to running in new strings.

The greatest improvements outside of design and machining embraced in the manufacture of sucker rods is the character of material used at the present time. For the sake of illustration, let us study sucker rod material from a metallurgical standpoint. Probably no one article of pumping equipment receives harder use, more severe abuse, and needs scientific treatment more than the sucker rod stock. Approached from this angle, we will briefly discuss the outstanding improvements of a chemical and physical nature employed in the laboratories of the majority of rod manufacturers today.

THOSE who become associated with the working problems of oil well equipment and the failure of parts are soon impressed with this one outstanding fact—by far the greater percentage of part breakage in equipment which is subjected to shock, vibratory stresses and reverse bending can be traced to fatigue failure.

Altho a somewhat uncertain term, fatigue failure is primarily the result of alternating stresses, the magnitude of which are much below the actual elastic limit of the metal. It was observed by Merrils (F. S.) that metal subjected to strain by alternating stresses did not fail by a persistent weakening, as was previously believed, but that the metal seemed to absorb a form of energy during the period of application of the stress until the resistance of the metal to such absorption was exceeded. Examination of the end of a sucker rod which has failed by fatigue will show several features to support Merrils' view. The parting of the rod is abrupt, occurring sharply at right angles to the length, in a transverse section, and with very little or no elongation or "necking down" of the metal at the break. It is not logical to conceive of such failure by a gradual tiring ("letting down" or weakening) of the metal. As Merrils has set forth, it appears most probable that an accumulation of stress at some point along the rod has *suddenly* exceeded the endurance limit of the metal.

If one were to judge the structure of the metal of which the rod is composed by "reading the fracture" he would be incorrectly informed, as the properties are only apparent from the fracture and not characteristic of the treatment. From the nature of the break, a piece of metal may appear to be extremely hard or it may show a hard rim encircling an apparently spongy center, with occasional hard or soft spots. Yet, when examined with the microscope, the metal may show structure and properties truly characteristic of its composition.

THE fact that the forces involved in fatigue failures are not easily determinable or well understood accounts for some of the difficulties encountered in the solution of problems involved in producing products to withstand these forces. As the time required for performing experiments and endurance tests of metals before manufacture is prohibitive, attempts have been made to correlate the endurance limit with other physical properties of the metal. The former belief that a definite relation existed between endurance limits and limits of proportionality have been shown to be untrue, and the nearest approach to correlation of these properties has been expressed by F. W. Rowe, who observed that the ratio of the limiting stress to the tensile strength fell between 0.35 and 0.60 under reverse bending stresses. Recently, however, reliable data has been published to show that 85 per cent of all cases of the determination of this ratio expressed by Rowe lies between 0.45 and 0.55. At a glance it will be seen that if the ratio of limiting stress to tensile strength is 0.45—0.55, endurance limit of a piece of metal will be roughly one half of the tensile strength. It follows then, that variation in both the endurance limit or fatigue range and the tensile strength of a piece of metal will be directly proportional.

TO THE laymen or those not connected with the practice or with the technical staffs of oil well supply companies, the terms heat treatment, anneal, quench and draw are only vaguely familiar. For the benefit of these and in view of the non-technical nature of this paper, a few words in explanation of these terms may be appreciated.

In a few words, heat treatment means the manipulation of heat for the purpose of altering the internal structure and hence the physical or structural properties of the metal treated. The more or less familiar terms designating the divisions of heat teatment are anneal, normalize, quench and tempering or drawing. Each of

FREEDOM
100% Pennsylvania Motor Oil
—*guaranteed by the complete refinery which makes it*

Just as buyers of machinery prefer their purchases covered by one guarantee, you can buy Freedom 100% Pennsylvania Motor Oils on the same basis.

All elements which go into these exceptional products are refined by this one complete organization, The Freedom Oil Works Company, in its two plants, at Freedom and at Coraopolis, Penna.

At Freedom, is refined the wonderful 100% Pennsylvania Crude Neutrals which are used *exclusively*.

At Coraopolis, is refined the exceptional 450 Bright Stock (Sharples Process) which also is used *exclusively*.

Then the two are blended to high specifications by this 48 year old organization — you get a complete line of oils, consequently, that attracts business and HOLDS it.

Immediate deliveries can be made in tank cars, in compartment cars, barrels, or drums.

Also available for immediate shipment

450 Bright Stock (Sharples Process) which requires less neutral to blend to the ordinarily required specifications.

100% Pennsylvania Motor Oils, *blended to your own Specifications*, from Freedom 450 Bright Stock and Freedom 100% Pennsylvania Crude Neutrals.

Freedom Quality Stocks
600 Steam Refined
635 Steam Refined
650 Steam Refined

Freedom 300 Mineral Seal Oil made to Railroad Specifications.

Freedom Filtered Burning Oils.

The Freedom Oil Works Company
Freedom, Penna.

Established 1879
Refineries at Freedom and Coraopolis, Pennsylvania

FREEDOM

these refers to a different method of producing a temperature change in the metal after it has been heated to a predetermined temperature. If it be allowed to cool very slowly, usually in some non-conducting material or in a furnace under control, the metal is said to have been annealed and is in the softest possible condition. If the rate be increased slightly by allowing the cooling to occur in the atmosphere without draft, then the metal is considered normalized. If the cooling be attained by plunging the metal into cold oil, cold water, brine, liquid air, or other prepared media, it is said to have been quenched. Tempering can be done by cooling at a rate between normalizing and quenching, but it is best accomplished by quenching and then reheating to a temperature between 300 degrees Fahrenheit and 1200 degrees Fahrenheit, according to the hardness desired.

TO THE uninitiated, the application of the science of heat treatment to steel, principally, is shrouded in mystery, but with a knowledge of a few fundamental principles of the metallurgy of iron and steel, the variable properties obtained thru heat treatment are only the results of checking the completion of physical changes which occur in the steel under the influence of heat. Hence we find the common descriptive words brittle, hard, tough, ductile and soft associated with the physical properties, tensile strength, elastic limit, elongation and reduction of area, the numerical values of which are altered to suit a particular purpose.

For our purpose, steel may be considered as a mixture of carbon dissolved in iron in the form of iron carbide, with iron as the excess element. Compounds of manganese, silicon, sulphur and phosphorus, present as impurities, exert a profound influence on the properties of the steel and the results which can be obtained by heat treatment.

Sucker rod stock may be taken as a specific example. After years of experimentation and field tests this steel is being produced under the most rigid specifications, which define the chemical composition within narrow limits and outline tests which the steel must pass successfully before the bars are accepted for use in the rod department.

Segregation in steel induced by the presence of non-metallic impurities is the common cause of rejection. The exact effect of these inclusions is not definitely understood, but from examination of failed rods, it appears that discontinuity of structure produced by the separation of the constituents thruout the steel promotes premature failure. As steel owes its properties

to the intimate mixture of its components, rather than a stage of segregation of these components, one can easily conceive of erratic properties and results of heat treatment of the same steel after segregation had occurred.

What is true concerning choice of material, inspection, tests and experimentation for sucker rod stock may apply equally well to balls and seats, standing valve bodies, cages and other pump fittings.

AFTER many years of close association with pumping problems, one authority has arrived at the conclusion that 75 per cent of sucker rod failure is due to improper handling.

When the new rods are delivered to a well, they will be straight, if they have been handled carefully in transit. It often occurs, however, that bundles of rods are unloaded from trucks or cars without the aid of cranes, and are subsequently bent or kinked before being placed into service. Some operators work under the false impression that kinks can be removed satisfactorily by means of hammering the rods on the derrick floor. From external appearances this method is only effective in distorting the grain in a section where the elastic limit of the metal has already been exceeded in the first bending.

As kinks, twists, grip-cuts and surface abrasions are fruitful sources of fatigue failure, workmen should be impressed with the fact that when rods are kinked, they are no longer safe for use in heavy pumping, even though they have been straightened. When a piece of steel has been stressed beyond its elastic limit, it is in a state of strain. In order to relieve this condition, the metal must be heated slightly above the plastic stage in order that the distorted and partially displaced crystalline grains may resume their normal relations.

This should not encourage the heating of straightened rods in open fires in the field, as the method and nature of the heating is highly important in the operation. If the relief of strain in the metal is to be uniform, it is obvious that the heating must be uniform and carried at the correct temperature.

It may be timely to advise here against the use of salvaged sucker rods, for the reason stated in the foregoing paragraphs. Men or companies other than the original manufacturers who recover bent, twisted or corkscrewed sucker rods and offer them to the trade again after they have been straightened by hammering or pressing together with promiscuous heat treatment are a menace in the field of oil well equipment. Any economy in the first cost enjoyed from the use of such rods will sooner or later be reversed and compounded in repair bills.

THE above is one of the many different type buildings found in our new HAND BOOK OF SERVICE STATION DESIGNS.

This type building can be furnished in 154 different combinations as to size of building and plan of canopy. We can furnish a design that will suit any possible requirement of yours.

Write for our catalog — it will answer all your questions as to what kind of building to use.

J. R. DOELKER CO.
898 Ingleside Ave. Columbus, Ohio

Gid-dap Napoleon, It Looks Like Rain!

BUT old Napoleon didn't always get the driver under cover before the rain came down.

Today — a couple of turns of a nickeled crank on the door of the car — and up jumps the glass. Let it rain, we're in where it's dry. Quick, convenient ways are taking the place of out-of-date methods.

Oil cups and funnels may have been good enough, back in the days when old Napoleon shied at every "horseless carriage" along the highway,— but not so in this age of hustle.

Today, a station to be "in the money" in the race for business has to give quick, convenient, honest service to every customer.

The Rhodes Prefilled Method of dispensing motor oil is the fastest, most convenient and accurate system yet devised for this purpose and it has the added appeal to the motorist of enabling him to see what he gets and to get all he sees.

The cost of Rhodes Equipment is very low, yet users will tell you that it has remarkable capacity for increasing sales volume and profits.

JAY B. RHODES COMPANY
Kalamazoo Michigan

RHODES PRE-FILLED OIL DISPENSERS

General view of the Valley City Oil Co's. combination bulk and filling station in Grand Rapids, Mich. It is one of three operated by Don G. McAfee

Old Line Jobbers Make More Money Ignoring Bulk Stations' Prices

By Ward K. Halbert
N. P. N. STAFF WRITER

GRAND RAPIDS, Mich, Oct. 21

IT IS better for the old line gasoline marketing company to sell at the higher posted prices of the market leaders than to try to meet the lower prices of the new type bulk storage service stations, Don C. McAfee, owner of three bulk storage stations in Michigan, warns. They will be money ahead in the long run and he cited his own experience in Grand Rapids as proof.

Mr. McAfee opened his Valley City Oil Co. station here April 5, selling U. S. Motor gasoline for 17.5 cents a gallon. The Standard Oil Co.'s posted price which the old line companies were following, was 19.7 cents a gallon. The older companies met the new competition. All prices were held down until about the middle of August; Grimes & Madigan, well established Independent marketers, returned their price to the old schedule. A few days later on Aug. 17 the other companies followed Grimes & Madigan's lead. Since then the Valley City company has reduced gasoline 2 cents more to 15.5 cents.

"About 75,000 gallons of gasoline a day are consumed in Grand Rapids," Mr. McAfee said. "Of that volume, 5,000 gallons is all I can ask for. That leaves 70,000 gallons for the rest of the companies. If they meet my price they probably can cut my volume in half. That will give them 72,500 gallons a day and me 2,500 gallons.

"The gross return from 72,500 gallons at 17.5 cents a gallon is $12,687.50 and of 70,000 gallons at 19.7 cents $13,790. In other words there is more than $1,000 a day in it for them to handle the smaller volume and forget about me."

Unfortunately for the jobber he has misinterpreted needs of motorists, Mr. McAfee said, and is giving these buyers service they do not want. To give this service huge investments in leases, buildings and equipment have been made, adding to the overhead, and consequently making the public pay a higher price for gasoline.

"The oil men have not kept up with the time," he said. "In order to get up-to-date they would have to change their whole policy and they don't want to do it."

"The jobbers and major marketers here did the wise thing when they raised their prices back to a point where they would cover their costs," he continued. "It will cost them a great deal less money to let me alone than to try to meet my price. They know as well as I do that they can't afford to meet my prices.

"But I can't handle all the business and don't want it.

"Furthermore, think of the futility of the thing. My investment is small. There are filling stations in Grand Rapids that cost as much as my whole plant. My overhead is correspondingly small. They can't win in a price cutting contest with me.

"It is my open policy to sell on a basis of price. It is a volume proposition entirely. We make a low price, the same to everybody, that will attract cash customers, and we dispense good merchandise to bring them back again. We make plenty of margin. If that is being a price cutter, that's what I am. But it is a sound, economical way to market oil and gasoline."

In addition to the Grand Rapids station Mr. McAfee owns the Port Huron Oil Co., Port Huron, Mich., and the Royal Oil Co., Muskegon, which for two years has had the lowest gasoline price on the Dunes highway.

Ten years ago he entered the oil business, organizing the National Co-operative Oil Co. in Grand Rapids, which was inspired by the Consumers Service Stations, Inc., of Iowa. National Co-operative continues under another name. Shortly after this venture he promoted five similar companies, including the Ionia Co-operative Oil Co., Ionia, Mich., which Standard Oil Co. of Indiana last year bought from Gov. Fred Green.

THE Detroit Independent Oil Co. was Mr. McAfee's next venture. Begining "on a shoestring" with borrowed capital and not much at that, he expanded the company to 57 filling stations in five years and sold it to Sinclair Refining Co. He is frank to say now that his experience with choice city locations, trucking expenses and small volume in Detroit cured him permanently of any desire to conduct this kind of an oil business.

The last time Mr. McAfee got into

Past and Present in Oil Marketing

Calm and unruffled were the 1880's if this horse and tank wagon driver are any indication of the trend of those days. This exhibit of the 1884 and 1927 method of oil delivery, entered by the Continental Oil Co., Denver, in the "Parade of Progress" at Pueblo, Colo. in September in connection with the Colorado state fair, is indicative of the slow tread of the past as compared with the hurried, fast-moving, high-powered pace of today.

the spot light was during the Michigan Independent Oil Men's Association convention at Detroit last February when he brought suit against the association, its officers, large competitors and small competitors asking that they be enjoined from interfering with his Muskegon business. A temporary injunction still is in force, not having come to a formal hearing.

Mr. McAfee's station at Grand Rapids embodies most of the features that are considered essential to a complete filling station. The location is such that it would get a great deal of business even if it sold at the prices maintained by most other dealers. It faces Monroe avenue which in Grand Rapids is U. S. highway 131 and Michigan highways 44 and 37. Moreover the view of the station is unobstructed for several blocks in each direction.

The station building stands 50 feet from the street but a high electric sign conspicuously overhangs the curb. The letters "G-A-S" 3 feet high, are in white paint and are brightly illuminated at night.

NO EXPENSIVE concrete pavements have been laid. Drives are of cinders, rolled firm and swept clean of trash. There is no curb in front so a car can come in anywhere along the station front. Five 10-gallon visible pumps stand in a row on concrete blocks 25 feet apart with a 25-foot drive on each side. Steel stands holding three trays of motor oil in quart jars are placed conspicuously beside the drive.

Ordinarily the station has one man on each pump besides the head man. On busy days, holidays and Saturday afternoons, there are two men to a pump.

The station is a portable steel building, 30 by 40 feet over all but T shaped. Wings at each side house steel drain pits. The main part of the building is rectangular and is divided into four compartments, a sales room and auto supply store in front, an elaborate ladies' rest room, an office for the station superintendent and a toilet room for men.

ONLY a small line of auto supplies is carried. There are only 15 or 20 items such as patches, spark plugs, light bulbs, valve cores etc.

The nearby warehouse contains the stock of motor oil in drums. It is purchased in truck loads from a Chicago compounder who has a branch in Grand Rapids. The warehouse also provides a place for the air compressor and the tank car unloading pump. The latter is used to transfer gasoline from the bulk storage to the 1000-gallon tanks at each pump.

There is storage on the ground for nearly six cars of gasoline but not a large tank is in the place. The bulk storage of this plant consists of 14 tanks of 3,000 gallons capacity each, all connected. They are buried near the end of the team track by the warehouse, side by side in two equal rows. The piping is so manifolded that each tank may be connected with any other tank or used only by itself as a unit.

Mr. McAfee gives five reasons for considering the small tank set-up a superior storage arrangement. Here they are:

"1. The installation is cheaper. The tankage itself is not cheaper in cost per gallon, but the excavation is so much smaller in case they have to be buried. The deeper the hole the more expensive it is. And in this instance the excavation was made with a steam shovel. Moreover the steam shovel unloaded the little storage tanks from the flat cars and laid them gently in place in the pit.

"2. The storage is more elastic than if it were in larger units. Large quantities of high-test gasoline might be carried in winter and in the spring the stock could be permitted to diminish, filling the space promptly with a product of more seasonable demand.

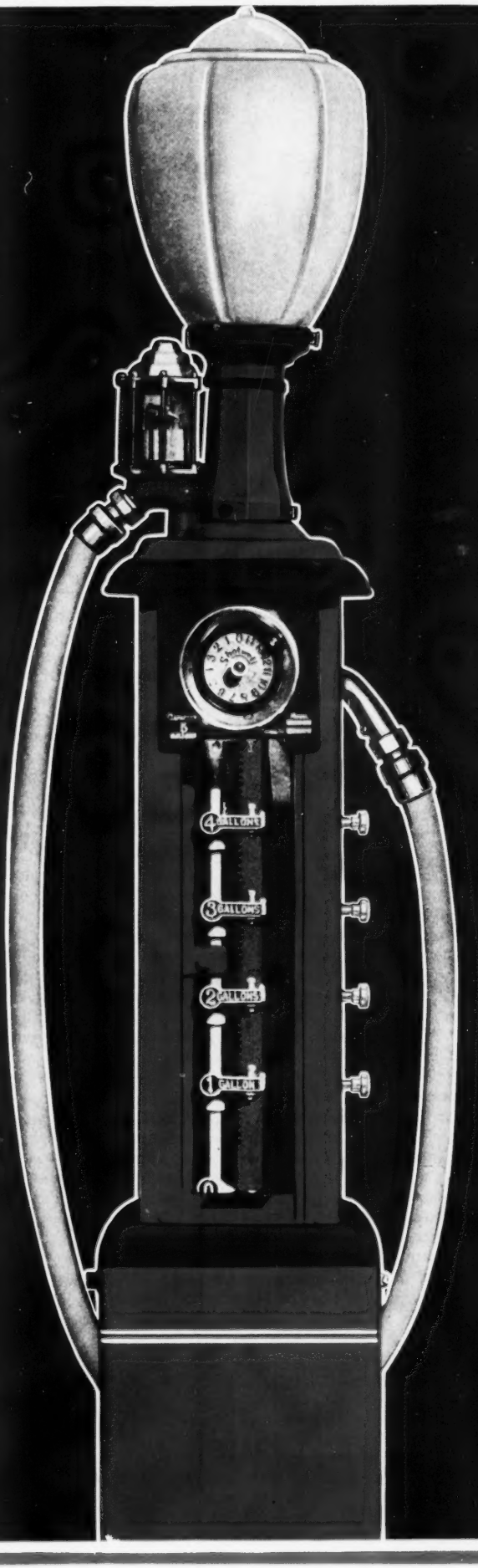
"3. Evaporation, leakage, theft or any outage can be detected much more quickly with a small tank. The difference of 100 gallons in a 10,000-gallon tank will hardly show on a stick while in a 3,000-gallon tank it shows up plainly.

"4. If a tank develops trouble, the whole plant is not out of order. It can be isolated from the rest of the battery until there is time to repair it. Then it can be taken out of the ground and gone over thoroughly if need be, without disturbing the others. If one of the tanks settles and gets off the general level it can be detected immediately by the derangement of the above-ground system of pipes.

"5. The salvage value of a small tank is much greater than that of a large one, because they have more uses and can be handled so much easier."

MR. McAFEE worked out a simple plan of doing away with the constant gauging of motor oil tanks and checking pump boys' sales. The motor oil is kept in drums in the warehouse. Pump boys are not permitted to go there. The man at the warehouse is bonded and his stocks and cash are made to balance. When a pump boy comes on duty he is issued $25 in change. If he wants motor oil he yells to the man in the warehouse for it and the latter brings it out in jars. The pump boy pays for the oil. When he goes off duty he sells what oil he has left for cash to the man who relieves him.

Gasoline in the 1000-gallon tank under each man's pump is checked by a stick at the end of each shift and is made to balance with cash.



One of the Industry's Longest Lasting Pumps

RINGBELL

De Luxe

(with or without See Gage)

Unsurpassed for Precision, Speed and Ease of Operation

Famous the world over for its unequalled BALL BEARING Mechanism. No other pump has all the RINGBELL advantages—Q.D. trigger handle, unrivalled registering meter, enclosed driving mechanism, fewest parts, bell rings at every gallon, easy installation, additional stops on side for convenience of operator and customer. And the price is exceptionally low.

Also write today for complete information on our low-priced Visibles and big value One-Gallon Pumps.

Approved by National Board of Fire Underwriters.

SHOTWELL

Pump and Tank Company

Indianapolis Boston

District Offices in Principal Cities

See our display Booths 2 and 3, American Oil Men's Association Convention, West Baden, Nov. 2, 3 and 4.

SHOTWELL

Ball Bearing

PUMPS

Problems Encountered in Handling Panhandle Crude*

By William Victor Vietti, Ponca City, Okla.
and
William A. Oberlin, Fort Worth, Tex.

CRUDE petroleum produced in the Texas Panhandle oil field is both an asphalt and a paraffin base oil and is further characterized by being a high gravity crude with an extremely high cold test. An eight-well composite of Panhandle crude showed the following characteristics:

Gravity, 36.6° A.P.I.

Viscosity: 61 sec. Saybolt at 100° F., 170 sec. Saybolt at 75° F., 1560 sec. Saybolt at 50° F. (stirring).

Cold Test, 60° F.

Composition:

Distillation test: Gasoline 28.8 per cent, Kerosene 4.8 per cent, Gas Oil 30.7 per cent, Fuel Oil 34.7 per cent. Wax 19.2 per cent, Asphalt 13 per cent, Sulfur[1] 0.8 per cent.

Subsurface Conditions

The original pressure in the formation in the Panhandle field closely approximated 420 pounds gage or 435 pounds absolute pressure. Temperatures taken indicate that the formation temperatures do not exceed 90° Fahr. The following temperatures are typical measurements taken on one lease:

Table 1. Temperatures in Panhandle Wells

	Oil Production Bbl.	Gas Production M. Cu. Ft.	Temperature 5 ft. off bottom Deg. F.	Temperature 10 ft. off bottom Deg. F.	Temperature Top of Liner Deg. F.	Temperature at Surface Deg. F.
Well No. 1	120	1,000	86.5	86	74	65
Well No. 2	210	5,000	....	..	67	60
Well No. 3	450	2,500	....	..	73	62
Well No. 4	410	3,500	....	..	68	62

Both pressures and temperatures are subnormal for the average depth (3000 feet) of the oil formation.

The effect of the gas expanding from the formation pressures to well and atmospheric pressures is shown very clearly by these results. The casings in wells Nos. 1, 3 and 4 were cemented above the pay; well No. 2 was not cemented. Some free gas was encountered in a formation above the oil pay and is not cased in wells Nos. 1 and 3. The gas entering the well in wells Nos. 2 and 4 comes through the liner, presumably from the upper gas, by means of a connection through the formations back from the well, or from a gas sand immediately above the pay. The point of entry of the gas into the well is clearly pointed out by the temperature measurements, and is at the top of the liner in wells Nos. 1 and 3, and through the liner in wells Nos. 2 and 4.

Occurrence and Handling of Paraffin

THE separation of paraffin from Panhandle crude is localized almost entirely in the flow string. The amount of paraffin formed varies with each well, but can generally be said to increase with increased gas and decrease with increased oil production. Flow strings, when pulled out of a flowing well (which is flowed by gas entering under the casing), exhibit small amounts of paraffin down to 800 feet. Between 800 and 1200 feet the paraffin thickened, and if not cleaned out, plugged the flow string in this section. From 2000 feet down, the paraffin gradually disappears and the last few joints are practically free from paraffin. Paraffin occurs from the point of entry of gas up to 800 feet from the surface, and even to the surface when excessive amounts of gas are produced with the oil. The separation of paraffin seems to be controlled by the cooling caused by gas expansion.

Swabbing wells show a general paraffin condition throughout the casing. This is due to the swab carrying paraffin on both downward and upward travel. The swab will shove paraffin ahead of it on the down stroke and unless a vigorous head follows the swab, this paraffin tends to collect below the casing, restricting the hole area and also coming in contact with the oil pay. The paraffin collected below the casing gradually decreases the production of a well. It is cleaned out by the use of a string of tools and is often supplemented by the use of gasoline and kerosene. The swab with the check valve removed is used at first in flowing wells to clean out the paraffin collected in the casing. As a general rule, the frequent running of a swab in a flowing well handles the paraffin satisfactorily.

Infrequent or non-use of the swab results in the paraffining of the pay, and a large decrease in production. A comparison in this respect is available in the granite wash area. One well, 960 barrel initial production, was cleaned of paraffin by running the checkless swab twice a day. This well was still producing 425 barrels one year after completion. Another well, in an adjoining lease came in for 1,200 barrels. This well was allowed to flow until the paraffin plugged the casing. It was cleaned out with tools, using 60 barrels of gasoline to hasten the process. This was repeated twice, using 90 and 120 barrels of gasoline, respectively. Production was much smaller after each cleanout, and after the third cleanout the well was flowing 100 barrels daily. This well is now a small producer, making around 25 barrels daily. There is no question here but that the paraffin was driven into the formation by the action of the tools. This could have been avoided by cleaning the casing of paraffin every day, or every other day.

A study of paraffin conditions in each well determines whether the swab should be run twice a day, daily or even weekly.

Effect of Gas-Lift and Flowing Through Tubing

THE gas lift, and the practice of flowing through tubing, have considerably reduced the use of the swab and its attendant evils in the Panhandle. Different conditions were imposed on the wells, and to meet these better tools were devised to handle the paraffin. A paraffin cutter or "flow devil", was designed by N. O. Miller[2] to eliminate the use of the swab in flowing wells. This tool was adapted to use in tubing. It cuts out the paraffin which is then flowed up the casing and out into the stock tank, through the annular opening by the flow of oil and gas. By its careful use paraffin is removed as fast as it is cut. Gas-

(1) Smith (U.S.B.M. Circular No. 6014, "Analysis of Panhandle and Big Lake Crudes," December 1926) found an average sulfur content of 0.6 per cent.

*A contribution from the research department of the Marland Refining Co. of Oklahoma and the production engineering department of the Marland Oil Co. of Texas.

2. For a full description of this tool and a discussion of its use, see "Some New Aspects of the Gas Lift", by E. O. Bennett and K. C. Sclater, Petroleum Development and Technology in 1926 A.I.M.E. Pamphlet No. 1667-G. See also C. E. Reistle, Jr., "Removing Paraffine from Wells", Oil & Gas Jnl. May 12th, 1927.

GREASE COMPOUNDING MADE EASY!

A new book "GREASE COMPOUNDING MADE EASY" by Forrest A. Hoff is just out. Contains 100 certified grease formulas, with full instructions as to their manufacture and uses.

Explains the only two methods of making Cup Greases and gives Formulas for: Brick greases, Fibre greases (8 grades); Transmission grease; Cup grease (8 grades); Double decomposition grease; Ford non-chatter base; Heavy auto oil; Medium auto oil; Light auto oil. All Formulas figured in one-barrel batches.

A laboratory analysis of only one grease sample costs $25.00. In GREASE COMPOUNDING MADE EASY you get 100 certified grease formulas for $25. This includes instructions how to make them, so simple that any one having steam and a kettle and following directions carefully, will have good success in manufacturing greases.

Refiners, Compounders and Jobbers interested in making their own greases will find this book "GREASE COMPOUNDING MADE EASY" a profitable investment.

Send check for $25, and this book with 100 Grease Formulas will be mailed you promptly.

NATIONAL PETROLEUM NEWS

1213 W. 3rd St., Cleveland, O.

lift wells, flowing pipe line oil, show paraffin forming in the tubing, 1500 to 2000 feet off bottom to the surface, as in the flowing wells. Wells making water on the gas-lift deposit paraffin from the bottom of the tubing to the surface. Gas-lift wells flowing high percentage of water show no paraffin formation. One of the gas-lift wells flowing 80 per cent water has been flowing 2 months without any noticeable paraffin formation.

Kerosene as Paraffin Solvent

KEROSENE has been used as a solvent for paraffin, with some success in increasing production. The results given below are typical after lubricating from two to six drums of hot kerosene in wells which had shown rapid decline in production 2 to 3 days previously. The kerosene dissolved the paraffin obstructing the passage of oil, and the production regained, or surpassed, its normal value.

Table 2. Effect of Kerosene Wash On Production

Average Daily Production For A Week

Well No.	Method of Production	Before Lubrication	After Lubrication	Daily Increase
1	Gas Lift	90	97	7
2	Pump	60	88	28
3	Gas Lift	130	145	15
4	Pump	30	60	30

Kerosene has also been found useful in reducing operating pressures in gas-lift wells. Gas-lift wells will show a gradual increase in operating pressure, which cannot be accounted for except by the accumulation of paraffin at and near the bottom of the tubing, both in the casing and in the tubing. The lubrication of a few drums of kerosene into wells of this type reduces operating pressures 10 to 40 pounds to its original value.

A method of combating paraffin which has collected in the pay formation is to allow the well to stand for a few days. If the well is not gassing, the face of the well bore is warmed by conduction from the formation adjacent to the well to temperatures approaching the original subsurface temperatures, and the warm oil is given an opportunity to soften and dissolve the paraffin. This has been tried and has given excellent results. A well on the gas lift which had decreased in production was shut in for 4 days. The average production for 2 weeks before shutdown was 45 barrels. After the shutdown the production increased to a 130 barrel average.

Pumping wells cause much trouble because of the separation of paraffin in the pump and in the tubing. Valves stick, friction is increased and pump action becomes jerky and erratic. This has caused much rod breakage, and the pulling of tubing and pump to steam the paraffin out. Some of these difficulties have been overcome by lubrication of kerosene into the well and by the introduction of steam, either through the casinghead, or by means of a string of small tubing 100 to 1000 feet long.

Use of Wire Line Pumps

Increased mechanical efficiency and increased production have resulted by the use of wire line pumps. The whip in the wire line keeps the paraffin from collecting in large amounts in the tubing. Breakage of the wire line is less than the previous breakage of rods. Wire line breakage was severe when the wire line pumps were first used. The field men noted that the breakage occurred at the wire rope socket connecting the wire rope to the short length of sucker rod between the pump and line. A study of this was made and the conclusion reached that the breakage occurred because the wire line was falling faster than the pump barrel, and the resulting bend broke the line. Three hundred feet of sucker rod are now attached to the top of the pump and the added weight and rigidity has partially eliminated this trouble. This defect has been further eliminated by slowing down the pumping stroke to 18 S.P.M. and pumping in the fourth hole to offset the decrease in pump capacity due to slower motion. This slower motion allows the pump to drop at a rate comparable to the pumping motion. Production has increased 10 to 30 barrels on each well where this has been tried. Increased production is also due to the installation of electrical motors, with the resulting evenness of operation. The wire line pump, however, is still causing a lot of trouble, due to breaking of the line, and to wire line wickers cutting cups and valves. These disadvantages are difficult to overcome, but once they are surmounted, the wire line pump will be superior to the present pumping equipment.

Flow lines are all equipped with heaters made by welding two or more joints of larger pipe on the flow line and providing for an inlet and an outlet for steam. Some flow lines are equipped with steam jets welded into the flow line near the well. The periodic injection of steam cleans the paraffin out of the flow line.

Flow tanks, separators and stock tanks are all equipped with steam coils. The oil is kept above the congealing point and the paraffin remains in solution.

Experimental Heating of Panhandle Crude

Samples of Panhandle crude were heated for varying periods of time in closed vessels in a temperature-reg-

ulated electric oven. After a definite period of time, as indicated in the tables following, a vessel was removed from the oven. A sample was taken and the vessel of heated crude stored at another temperature. A cold test was then taken on this first sample, which represented the state of the crude immediately after heating. At the stated periods of time, thereafter, another sample was removed and the cold test taken. A few viscosities were also taken and measured on two of the heated samples. Those viscosities were taken at 100 degrees Fahr. and any effect on viscosity was probably lost, due to the heating to this higher temperature. A sufficient amount of crude was heated to provide a number of samples for the measurements taken, without mixing these samples after testing with the original batch. The results obtained are summarized in Tables 3 to 6.

A sample of crude was heated in contact with fuller's earth, and another in contact with freshly burned lime. The crudes were then filtered and cold tests were taken as before. These results are summarized in Table 7.

Various producers in the Panhandle field were, at one time, approached by salesmen selling compounds which it was claimed would reduce the cold test of the crude. Two samples of one of these compounds were obtained and were analyzed. The analysis gave the following:

Sample No.	Na O H Per Cent	Na_2CO_3 Per Cent	Na H CO_3 Per Cent	Crude Napthalene Per Cent
1	21.8	5.3		72.9
2		25.0	2	73.0

The chemical was probably a mixture of sodium hydroxide and naphthalene when originally mixed and absorbed carbon dioxide from the air. Cold test experiments were performed with samples Nos. 1 and 2 and these experiments are summarized in Table 8.

Discussion of Results

THE results tabulated in Table 3 clearly demonstrate the effect of heating Panhandle crude. The original crude showed a cold test of 60 degrees Fahr. The average room temperature during these experiments was 82 degrees Fahr. Four bottles were filled with the crude and these were treated as indicated in Table 3. The bottles containing crude at 82 degrees Fahr. showed little change on standing at 82 degrees Fahr. and at 40 degrees Fahr. Heating to 150 degrees Fahr. demonstrates the fact that the cold test of hot crude is kept at ±0 degrees Fahr. This lowered cold test gradually regains its original value upon being kept at the lower temperatures of 40 degrees and 82 degrees Fahr.

The results tabulated in Tables 4,

Table 3. Cold-Test Hysteresis of Panhandle Crude

(Eight-well Composite, 36.6° A. P. I.)

Heated Temperature Deg. F.	Original Cold Test Deg. F.	Storage Temperature Deg. F.	Cold Tests (Deg. F.) found after storing for time indicated 0 Hr.	24 Hr.	48 Hr.	72 Hr.	96 Hr.
150	60	150	0	0	0	0	2
150	60	82	0	0	44	62	66
150	60	40	0	20	24	42	50
82	60	82	60	66	65	66	66
82	60	40	60	60	64	64	64

Table 4. Cold Test Hysteresis of Panhandle Crude

(Eight-well Composite, 36.6° A. P. I., Original Cold Test of 60° F.)

Oven Temperature Deg. F.	Time In Oven Hr.	Storage Temperature Deg. F.	Cold Tests found after storing for time indicated 0 Hr.	24 Hr.	48 Hr.	72 Hr.
115	2	40	0	23	16	34
115	4	40	0	0	16	18
115	12	40	2	18	22	36
115	24	40	0	28	38	48

Table 5. Cold Test Hysteresis of Panhandle Crude

(Eight-well Composite, 36.6° A. P. I., Original Cold Test of 60° F.)

Oven Temperature Deg. F.	Time In Oven Hr.	Storage Temperature Deg. F.	Cold Tests found after storing for time indicated 0 Hr.	24 Hr.	48 Hr.	72 Hr.
115	3	40	0	24	31	36
115	6	40	5	38	40	44
115	12	40	0	36	46	48
115	24	40	0	34	35	37

Table 6. Viscosity Hysteresis of Panhandle Crude

(Eight-well Composite, 36.6° A. P. I., 170 Sec. Saybolt at 100° F.)

Oven Temperature Deg. F.	Storage Temperature Deg. F.	Average Saybolt Viscosities at 100° F. found after storing for time indicated 0 Hr.	24 Hr.	48 Hr.	72 Hr.
115	40	145	119	133	137
115	40	123	115	118	125

Banishes Fire Hazard from Cleaning!

FIRE hazard in cleaning is eliminated—even to the last remote possibility—by the use of OAKITE cleaning materials and methods.

OAKITE materials cannot ignite. Neither will they burn or explode. Either in solution for cleaning, or in the normal state in which they are shipped and stored. Make all of your cleaning *safe*, with OAKITE methods. Write for booklet, or ask to have one of our service men call. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada.

Oakite is manufactured only by

OAKITE PRODUCTS, INC.
42c Thames St., New York, N. Y.

(Formerly Oakley Chemical Co.)

OAKITE
Industrial Cleaning Materials and Methods

15/20°
above Zero!

That's the new cold test for Penn-Empire Motor Oils, now Sharples-processed to give real non-gumming winter lubrication service.

Now, your dealers can enable their customers to enjoy the long mileage, the heat and wear resisting properties of Penn-Empire Oils throughout the winter months. There's a real *extra* sales value in the new Penn-Empire Motor Oils.

EMPIRE OIL WORKS
Oil City Pa.

Motor Oils
Tractor Oils
IndustrialOils
Kerosene
Gasoline
Petroleum

When you buy Penn-Empire you get the best.

PENN EMPIRE

Table 7. Cold Test Hysteresis of Panhandle Crude After Heating with Fuller's Earth and With Lime

(Burnett Crude, Original Cold Test 70° F.)

Temperature Heated Deg. F.	Heated With	Cold Tests after storing at 85° F. for time indicated 48 Hr.	60 Hr.	84 Hr.
150	Fuller's Earth	34	55	66
150	Fresh Lime	20	50	67

Table 8. Cold Test Hysteresis of Panhandle Crude with Added Chemical

(Burnett Crude, Original Cold Test of 70° F., Stored at Room Temperature (85° F.)

Temperature Heated Deg. F.	Chemical Lb. per bbl.	Cold Tests found after storing for time indicated 0 Hr.	12 Hr.	24 Hr.	48 Hr.
Series 1 with Sample No. 1					
110	0—check	0	28	25	57
110	1.6	0	15	17	58
110	5.9	0	28	35	54
110	9.7	0	50	45	58
Series 2 with Sample No. 2.					
110	0—check	0	28	25	57
110	2.3	0	36	39	54
110	5.05	0	48	40	57
110	7.3	0	44	45	56

5, 7 and 8, show the same hysteresis of Panhandle crude upon heating to 110 and 115 degrees Fahr. There is also an effect due to the temperature at which the heated samples were stored and the length of time the samples were allowed to remain in the oven. The higher storage temperatures and the longer times of heating result in more rapid return of the oil to its original cold test. The cause is probably the same in each case.

Any action, whether chemical or physical, proceeds at a faster rate the higher the temperature. Storing at a higher temperature restores the crude more quickly to its original condition. The effect of time of heating is undoubtedly due to the higher temperature attained by the crude on standing in the oven a longer period, and is due to the fact it was not heated to the higher temperature quickly. This increased heat content requires a longer period of time to dissipate, and, in effect, the temperature is maintained at a higher value during the initial period of cooling.

This study of the cold test and viscosity characteristics was undertaken in the hope that it would yield information which would indicate the most satisfactory method of handling Panhandle crude during the winter months. The normal temperature drops below 60 degrees Fahr. during September, reaches a minimum of 34 degrees Fahr. in January, and does not rise above 60 degrees Fahr. until April. Soil temperatures 3 feet below the surface may be taken as the normal air temperature. Operations must be carried on for 6 months during which time the air temperature is below the cold test temperature of the crude.

Pipe Line Operation

THE low air and soil temperatures during the winter months forced the Panhandle operators to heat their oil in flow and stock tanks to keep it from congealing and to facilitate treating. The results of the experiments on Panhandle crude prove definitely, that after heating the crude to 115 degrees Fahr., the cold test regains its original value slowly. Immediately after heating, the cold test is 0 degrees Fahr., or below, and a period of 12 to 30 hours elapses before the cold test comes back to 32 degrees Fahr.

Winter movement of Panhandle crude through lease and various pipe lines had to be carried on with heated oil. All lines were buried 30 to 36 inches below the surface to reduce loss of heat. The loss of heat units from a heated oil line buried in the soil is that heat lost by conduction to the surrounding soil. The loss of heat is controlled, therefore, by the heat conductivity of the soil. Some typical conductivities are tabulated below, where

K=B.t.u. lost per sq. ft. exposed surface per hr. per degree Fahr. difference in temperature per ft. thickness.

Heat Loss to	K
Dry Sand	0.2
Dry Soil (Summer)	0.4
Damp Soil (Winter)	0.75
Wet Sand	2.00
Sand and Moving Water	2.00 plus
Air	2.00 plus

These data indicate the value of laying lines in a location with good drainage and protected from air and water currents.

Another important characteristic of Panhandle crude is the large viscosity-temperature effect. Panhandle crude at 125 degrees Fahr. approaches high gravity Mid-Continent crude in its viscosity; at 50 degrees Fahr. the viscosity is comparable to a low-gravity asphalt base oil. This thermo-viscosity effect is an added reason for heating the oil for transportation as capacities of the lines are greatly increased. Operation of pipe lines at maximum capacity reduces the time the oil is in the line and reduces the amount of heat lost per barrel of oil moved. Advantage may then be taken of this by having the average and final line temperature, for the same initial temperature, much higher, or by reducing the intake temperature and B.t.u. per barrel necessary to insure the same average and line temperature necessary as when pumping a smaller amount of oil.

Table 9 summarizes a few sample calculations as to what may be expected for an 8-inch line buried 36 inches under adverse conditions since K is taken as 1 and the soil temperature 32 degrees Fahr.

The normal soil temperature at the time these tests were performed was between 45 degrees and 55 degrees Fahr. The oil entered the pipe line at 120 degrees Fahr. and left the pipe line 11 miles away at 92 degrees Fahr. The pipe line was handling approximately 24,000 barrels daily at the time with a loss of 28 degrees Fahr., or 2.55 degrees Fahr. per mile.

Table 9. Temperature Drop in an 8-in. Heated Oil Line

(K = 1. Soil Temperature = 32 Deg. F.)
(Initial Oil Temperature, 115 Deg. F.)

Rate of Flow, bbl. per day	Distance Miles	Final Oil Temperature Deg. F.	Time of Flow Hr.	Probable Cold Test
10,000	15	37	11.7	Below 32° F.
	11	42	8.6	Below 25° F.
	7.5	56	5.98	Below 20° F.
20,000	15	51.5	5.9	Below 20° F.
	11	60.5	4.3	Below 10° F.
	7.5	74.5	2.99	Below 5° F.
30,000	15	61.8	3.92	Below 15° F.
	11	66.6	2.87	Below 5° F.
	7.5	85.2	1.96	Below 0° F.

Some actual temperatures taken on an 8-in. heated oil line are given in Table 10.

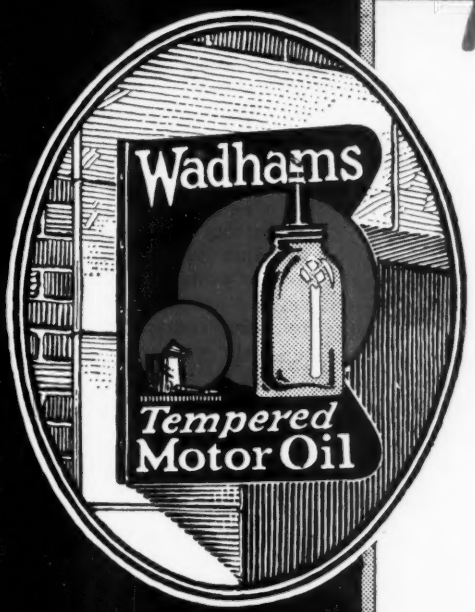
Table 10. Field Data; 8-in. Buried Hot Oil Line

(Date Taken Nov. 30, 1926. Normal Temperature 50 Deg. F. Initial Oil Temperature, 120 Deg. F.)

Time and Air Temperature	Distance from Heater and Soil Type	Depth of Reading In.	Distance From Line Ft.	Temperature of Soil Deg. F.
12:00 P.M.	11 miles	30 (on line)	0	92
73 Deg. F.	tight	34	1	79.7
	black	34	2	71.3
	clay	34	20	53.5
2:30 P.M.	5.5 miles	24 (on line)	0	92.2
82 Deg. F.	sandy	30	1	78
	soil	30	2	71.5
		30	20	55.5
4:30 P.M.	200 ft.	32	0	101.5
78 Deg. F.	sandy	36	1	78.5
	soil	36	2	69.7
		36	20	56.5

Wadhams
of Wisconsin
not only "has something" but *does* something!

for instance



—the 1928 series of Wadhams Dealer Helps and General Advertising for Tempered Motor Oil are already unleashing new power for the next heavy motoring season. An early start for the biggest oil year of history.

To get in on it—fill out the coupon today.

A PROPOSITION of profit and importance awaits the Dealer (*any size*) and Distributor (*any size*) who is tired of the handicaps—and suspicions—of selling oil which has nothing to say for itself except that "it's oil."

Wadhams Oil Company
Milwaukee, Wis.

Established 1879

Sign and mail this Coupon

WADHAMS OIL COMPANY, *Milwaukee, Wis.*

Gentlemen: Without obligating or committing ourselves we are willing to find out what you propose toward more profitable Oil Selling.

(*Firm Signature*)_____

by_____
(*Street Address*) (Position with Firm)

_____ *City*_____ *State*_____

Patent Pending

MORE OIL SALES

With oil displayed in this Rack holding 24 Dispensers. Has hinged caps covering each spout. All Bottle trays removable. The Neatest and Best Rack on the market.

Send for Particulars

WM. Neil & Co.
617 W. Division St. Chicago, Ill.

CURB SIGNS
FLANGED SIGNS
ROAD SIGNS

+

Write us
concerning our
No. 102 Curb Sign

+

AMERICAN IDEAL SIGN COMPANY
Marion Iowa

Table 11. Reduction of Heating on Closer Spacing of Heating Stations

(20,000 bbl. day. K = 1. Incoming Temperature = 70 Deg. F. Final Temperature desired = 60 Deg. F. Average Panhandle Crude.)

Distance Miles	Required Initial Temperature Deg. F.	Millions of Btu. Required		Saving in Btu. Percentage over 15 Mi.
		Each Station	15 Mi. Equiv.	
15	144	232.	232.	0.
11	109	122.4	166.9	27.1
7.5	88	56.55	113.1	51.2

This corresponds to an average earth conductivity of K=0.68.

The presence of small amounts of silt and the ever-present danger of paraffin forming in the pipe at points of sudden cooling (caused by water currents, etc.) necessitates the frequent use of line scrapers or go-devils. Scrapers may be sent through the modern welded lines with little danger of the scraper hanging up in the line. The accepted practice in the Panhandle is to send a scraper through the line daily, or every other day.

As a result of exhaustive studies of the characteristics of Panhandle crude, the following practices have been put into force:

The pipe line companies require that the oil be delivered to them on the lease at 90 degrees. Fahr. This insures a good quality pumping fluid and a sufficiently high temperature to insure delivery to the station or tank farm.

Continuous operation is desirable in order to prevent the oil from congealing and the building up of high pressures when operation is again started. A shut-down of short duration can be tolerated due to the cold test lag, but a shut down of 12 or more hours may prove serious. Heat must be supplied continuously to the soil to maintain the temperature gradient. It takes more heat units to bring soil temperatures up to a steady state than to maintain them in that state. A shut-down of a heated line allows the soil heat to dissipate. The extra heat needed to restore the steady state must come from the fresh oil which will be, in turn, cooled proportionately, and the friction and pressure increased.

ANOTHER interesting point brought out by these calculations, in order to determine the optimum heating temperature and location of stations was the saving in heat due to the lessened distance between stations. Table 11 shows the results which may be expected for the same conditions as used in Table 8.

Table 11 shows that to maintain a temperature of 60 degrees Fahr. at the end of a pipe line that a spacing of stations 11 miles apart over a 15-mile spacing, results in a fuel saving of 27 per cent, and a spacing of 7.5 miles, or half the 15-mile spacing, results in a fuel saving of 51 per cent. Heating station investment and operation costs would be decreased 36 per cent for the 11-mile plan, and 100 per cent for the 7.5-mile plan. A balance on fuel cost and flexibility would determine the most economic design for any one set of conditions.

Effect of Paraffin on Corrosion

PANHANDLE crude contains an average of 0.8 per cent sulfur. The gas in the granite wash area is sweet, while the gas in the lime area is sour, containing 0.4 to 0.8 per cent hydrogen sulfide. The well brines are corrosive and the mixture of hydrogen sulfide and water constitute a highly corrosive mixture. There are a few gas-lift plants in the Panhandle obtaining their dry gas from the gasoline plants. This treated gas contains 1 to 10 per cent air and the use of this gas to flow wells adds oxygen to the corrosive elements existing in the wells. Notwithstanding the corrosive well waters, the sulfur gas and the oxygen, very little corrosion of well tubing occurs. It has been noticed that corrosion in the Panhandle is limited to those metal surfaces free of paraffin. It has previously been noted in this article that in most gas-lift wells that paraffin forms from the bottom to the top of the tubing. Corrosion should be the greatest in gas-lift wells, but is found to be very small in extent. The paraffin forms a protective coating and considerably reduces the corrosion to be expected.

Goats Keep Grass Down On Tank Farms

PONCA CITY, Oct. 21.—A new use for goats has been discovered by the Marland Refining Co., with headquarters here.

A herd of 1500 has just been installed at the Marland tank farm of 160 acres here to act as mowing machines. The task of keeping the grass mowed as one of the first safety requirements where crude and gasoline is stored, has been considerable at this farm. There are 100 tanks holding 14,000,000 barrels of crude and gasoline. Surrounding each tank is a high fire wall behind which a mowing machine cannot operate and a hand cutter has been used.

Now the goats keep the grass down, effecting a saving in man-power. They also furnish a cutting of wool at regular intervals.

A goat hospital is another institution established in connection with this tank farm. Baby goats are frequently wounded by dogs which get in, despite the high wall surrounding the farm, so the hospital has been erected to treat them.

BARNSDALL

SUPER-GAS

—an exclusive BARNSDALL motor fuel—scientifically and uniformly produced to fit the needs of the present day high compression motors.

POWER-IN KNOCK OUT

This famous "anti-knock" motor fuel is sold only through jobbers on an exclusive sales permit—*protected—no competition.*

Jobbers who sell SUPER-GAS are given the greatest amount of sales helps—national trade advertising—globes—signs—displays—local newspaper advertising—novelties—etc.

Don't delay—*write or wire at our expense* for further information on the SUPER-GAS selling plan.

The jobbers who sell SUPER-GAS in 1928 will make the most profit—ask us why.

Barnsdall 1928 Jobber Contracts now being written

Barnsdall Refineries, Inc.

Subsidiary BARNSDALL Corporation

Executive Offices
Petroleum Building
Tulsa, Okla.

General Sales Offices
624 So. Michigan Ave.
Chicago, Ill.

New York · Pittsburgh · St. Louis
Kansas City · St. Paul · Los Angeles

From
Oil Well to Jobber

High Fuel Economy in Refinery Reached By Use of Heat Exchangers

By P. W. Thomas
Combustion Equipment Co., Kansas City

Presented at Technical Sessions, Western Petroleum Refiners' Assn., Wichita, Kans., Oct. 9-11.

FUEL efficiency and cost of fuel are secondary to the one great need of the refinery—maximum production per dollar of investment in plant. To think of fuel in any sense around the refinery, one must think first of the plant production, and next of any contemplated change in fuel or firing methods. It might be that a salesman could prove conclusively the efficiency of his combustion equipment but, if this higher efficiency were made at the expense of any part of output, it would not be considered as economical. If, on the other hand, it gave the same output with reduced fuel percentage, it would be economical.

In another view of the situation—if certain fuel burning equipment raised the output of the plant, but also raised the fuel percentage, so that more fuel per barrel of output was consumed, I feel sure that most refineries would consider the equipment as desirable because of increased output, therefore truly economical. The ultimate goal in fuel economy in the refinery is such use of fuel that the production is increased and the fuel decreased—a seemingly impossible achievement.

To review the case, consider that the use of fuel may be divided as follows: 1. Fuel burned under boilers. 2. Fuel burned under stills.

We are all fairly familiar with methods of fuel economy in high pressure steam boilers. The theoretical maximum efficiency of such boilers ranges from 75 per cent to 80 per cent overall efficiency if oil or gas is burned. Any steam plant not obtaining these efficiencies can very quickly get them by installing good combustion equipment. One caution might be given at this point, namely, that steam generated at the highest possible boiler efficiency is often wasted quite freely so that, in many plants, a genuine reduction of fuel might be made by a more careful use of the steam itself. In this connection, I would suggest investigating the use of superheaters and condensation return appliances.

The greater part of the refinery fuel is used under stills. Here fuel consumption varies greatly, depending upon the type of the still and character of the charge in the still. Shell stills, whether crude or re-run, are not and never will be truly economical of fuel. If the actual fuel percentage is low in a given plant, it is generally due to a greater use of steam in the still, so that more fuel must be burned under boilers. Here again, output rules. If greater production follows the use of steam, more steam will be used.

Methods of firing shell stills vary: some refiners apparently believe in what I would call a very bad fire; others attempt a very good fire. To my mind, the best results have followed a fairly careful furnace installation, designed to give a fire with from 75 per cent to 100 per cent excess air. Such a fire permits maximum transfer by radiation with a fair amount of direct connection and, in a still set 8 to 10 feet off the ground, gives a good lower sheet condition.

Pipe stills present a new condition for furnace work. These stills, equipped with heat exchangers, built carefully for certain work, require definite quantities of heat presented to their surfaces through the entire tube bank.

CRACKING stills also have very definite limits within which heat may be transferred. As the limits are unusually low in initial temperature, and high in final temperature, under ordinary conditions these stills would not be economical in the use of fuel as, to obtain low initial temperature and increase the quantities of gases through the heating surface, a great deal of excess air would necessarily be used.

Certain fuel savings in stills having high final temperatures can be made by using a recuperator. This is a heat exchanger designed to return some of the heat of the waste gases to the fire by exchanging it into the combustion air.

To bring the fuel down, and incidentally what is most important, to increase the quantities of gases passing the heating surface within a given temperature range, recirculation of flue gases is resorted to. The object of a recirculating system is two-fold. Its main idea is to increase the output of the stil, both by actual heat transfer and by character of heat transfer. Its secondary object is to accomplish this increase with less fuel per barrel of output.

The first objective is reached simply enough. A proper recirculation system returns a quantity of flue gases to the fire, great enough that the fire is perfect in every respect, since the recirculated gases replace excess air. The flame proper is of high temperature, full of radiant heat. As the combustion gases merge with the lower temperature recirculation gases, a uniform mixture enters the tube bank, insuring fairly equal transfer by connection to each square foot of heating surface. At the same time, the quantity of radiant heat is diffused evenly over the primary heating surfaces. Properly proportioned, the amount of heat transferred by convection is made greater than that transferred by radiation so that a very even condition of transfer occurs in the heating surface. An even transfer insures that all the surface is working and that no one part is overworking. The result is, or should be, a greater daily output, with a longer cycle on the still, since less carbon will be formed in the lower tubes.

From what I have said up to this time, you might assume that the application of recirculation to cracking stills to accomplish maximum results is a simple matter. Quite the contrary is true, as you will see from the following comparison of actual operating results in a Mid-Continent refinery.

Two cracking stills of the same type and size but equipped with different recirculation systems give the following average results:

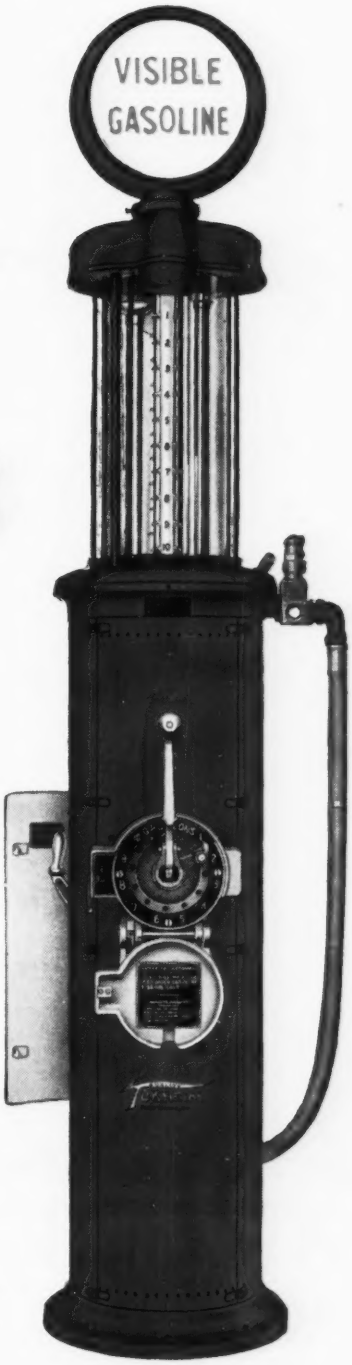
	No. 1	No. 2
Daily output finished gasoline, bbls.....	400	500
Initial temperature, degrees Fahr....	1,400	1,400
Final temperature, degrees Fahr.....	1,000	1,100
Days on stream	7	12
Days on stream per month.....	24	28
Monthly production gasoline.....	9,600	14,000
Gain No. 2 over No. 1 per mo., bbls.		4,400
Gain in per cent		46

Careful examination of these two units explained the difference in output and in days on stream as follows:

PYROMETER readings taken at various points disclosed that the still with the low output and short cycle did not have a uniform gas mixture entering the tube bank. The still with the high output and long cycle has a very uniform temperature below its tubes from end to end, and indicated a passage of gas uniform in temperature and quantity.

The still having the short cycle had a severe "hot spot"—a narrow band of high temperature gases entering the heating surface. Also, it quite evidently had more radiant heat in the furnace, explained by the fact that it has a greater fuel consumption and

Motorists expect Super Service



The handwriting on the wall

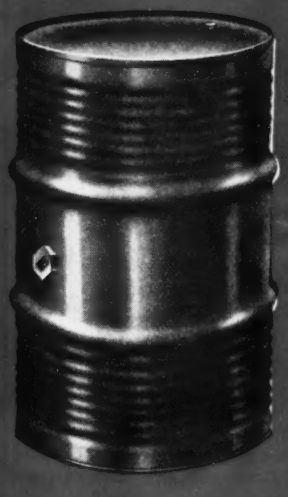
YOU know how it is yourself! When you use the 'phone, you want service—not in a minute, or ten seconds, but right away! When you go into a store, you want to be waited on at once!

It's just the same with your customers—they want action when they drive into a filling station. Tokheim Cut 600-605 is an *action* pump. The Master-Control mechanism is built for speedy service—and accurate service—"to the last drop." It saves time for your customers. It saves time for you. And it meters and records every ounce of gasoline, with never a chance of a mistake. It simply can't go wrong. Write Department "M" for the whole story on this unusual pump.

TOKHEIM OIL TANK & PUMP COMPANY
FORT WAYNE, INDIANA

TOKHEIM
Master Control
VISIBLE GASOLINE PUMPS

ST. LOUIS
STEEL BARRELS



Quality *Service*

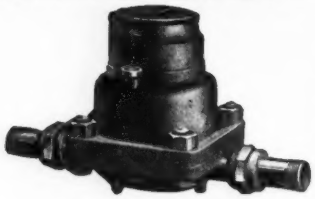
ST. LOUIS STEEL PACKAGE CO.

St. Louis, U. S. A.

Pacific Coast Plant

Western Steel Package Co., Oakland, Calif.

RELIABILITY COMES FIRST



Year after year, users of Niagara Oil or Gasoline Meters depend on them for reliable measurement of petroleum products in any quantity. Their accuracy is constant---the meters are simple and trouble proof---installation is easy. Write us for catalog.

NIAGARA OIL METERS

Built Since 1892 By

BUFFALO METER COMPANY

2889 Main Street :-: :-: **Buffalo, N. Y.**

more excess air than the still with the higher output.

Between radiant heat excess and the "hot spot", this still went considerably into vapor phase cracking, forming carbon rapidly and so remaining on stream not more than a week. In this short period, its daily output was limited by the fact that, even with excess air, it did not have sufficient gas quantities to work all of the heating surface. Therefore, the capacity of the still was cut by the failure to work part of the heating surface, and the cycle was shortened by overworking the remainder.

The second still, supplied uniform temperature and ample quantities of gases, with its initial temperature held down purely by recirculation, was enabled to maintain a higher output per day for 12 days on stream. This longer cycle is due to the reduction of radiant heat in the furnace, which means a lower rate of heat transfer per sq. ft. of initial surface, and to the fact that convection was practically equal throughout the tube bank. Both these conditions reduce vapor phase cracking in the tubes, insuring a longer cycle. It was observed that this still contained less hard carbon, being therefore more easily cleaned and more quickly returned on stream. This short cleaning period, coupled with the longer time on stream, accounts for the increased number of days on stream per month.

Recirculation represents the greatest advance that has ever been made in refinery fuel economy but its value is in direct proportion to the care and understanding with which the equipment is designed and applied.

With the introduction of recuperation and recirculation, and the extended use of heat exchangers, a very real fuel economy reaches the refiner. The possibilities of heat transfer are already affecting the design of stills very much. Stills of the future, using these new appliances, will be very economical of fuel.

Appeals Limit Near In Stabilizer Case

Staff Special

HOUSTON, Oct. 20.—Carbide & Carbon Chemicals Corp., which in August lost its suit in federal district court against The Texas Co., charging natural gasoline stabilizer infringements, has until Nov. 4, next, in which to file appeal papers. Notice of appeal was given at the time Federal Judge Hutcheson dismissed the plaintiff's bill for want of equity, Aug. 4, after finding all patent claims invalid.

The case, when officially appealed, will go to the fifth circuit court of appeals at New Orleans.

Analyses of Seminole District Crudes

By A. J. Kraemer

Associate Petroleum Chemist, Bureau of Mines

THE Bureau of Mines for a number of years has been carrying on an investigation of properties of crude petroleum from producing fields in the United States and the western hemisphere, and has published a series of reports on these fields, including oil fields of Oklahoma.[1]

Thanks are due to R. R. Brandenthaler and Peter Grandone, of the Petroleum Experiment Station of the Bureau of Mines, at Bartlesville, Okla., who reviewed the manuscript and contributed valuable suggestions. The samples were analyzed under the direction of E. C. Lane at the Bartlesville station.

The Seminole district is situated in the center of Seminole County, in east Central Oklahoma, and extends over a region which has for a long time been regarded as favorable by petroleum geologists. The discovery well was the Indian Territory Illuminating Oil Co.'s well No. 1 Dyer, Sec. 24-9-6, in the Hunton lime at a depth of 3900 feet. This well was the incentive for the intensive drilling campaign which made the district one of the most productive in the history of the petroleum industry in the United States.

In July, 1926, the Independent Oil & Gas Co. and R. F. Garland drilled a well southwest of the Indian Territory Illuminating Oil Co. well, and found production in the Wilcox sand in Sec. 26-9-6, at 4000-4100 feet. This well attained a peak production of 8000 barrels. Within 60 days from the bringing in of the Independent-Garland well, more than 100 wells were being drilled in the adjacent territory. The production of the Seminole district increased steadily and reached a peak of 525,610 barrels on July 30, 1927, which is the highest daily production for the district to date. This is the largest production of light oil from any single area in the history of the petroleum industry in the United States.

In December, 1926, the completion of unusually large wells caused a congestion of the available pipe line facilities, which initiated price cuts, storage programs, and attempts to reach an agreement to curtail production. Although these factors did not actually decrease the rate of production of the field, they undoubtedly contributed to restrain the yield below what it would have been if crude oil prices had remained where they stood in December, 1926.

The Seminole district at present consists of four pools: (1) Seminole Pool, which is in township 9-6; (2) Bowlegs, which is in township 8-6; (3) Earlsboro, in township 9-5, and (4) Searight, which is in township 10-6. The following table shows the production of the Seminole district for the 24 hours ending 7 a. m. June 25, 1927:

	Wells	Production
Seminole	306	104,100 barrels
Bowlegs	122	172,928 barrels
Earlsboro	79	92,311 barrels
Searight	43	36,093 barrels
Total	550	405,432 barrels

For a discussion of the methods used by the Bureau of Mines in

1. Dean, E. W., Bauer, A. D., Cooke, M. B., and Bopp, C. R., Properties of typical crude oils from the producing fields of Oklahoma: Reports of Investigations, Bureau of Mines, Serial 2364, June, 1922.

Table 2—"Base" of the Crude Oil

Sample No.	Field	Sand	Depth	Fraction distilling at atmospheric pressure between 250-275°C. (527-572°F.) Sp. Gr.	°A.P.I.	Fraction distilling at 40 mm. vacuum between 275-300°C. (527-572°F.) Cloud point °F.	Base of Crude
27335	Seminole	Wilcox	4136–4138	.840	37.0	80	Intermediate
27339	do	do	4128–4129	.841	36.8	85	do
27240	Bowlegs	do	4194–4200	.838	37.4	80	do
27343	do	do	4111–4134	.837	37.6	80	do
27236	Earlsboro	do	4257–4283	.834	38.2	75	do
27337	do	do	4230–4234	.841	36.8	80	do
27377	Searight	do	4502–4508	.835	38.0	80	do
27336	Seminole	Hunton	....	.837	37.6	80	do
27381	Searight	do	4055–4155	.836	37.8	75	do
27378	do	Earlsboro	3534–3570	.834	38.2	80	do
27379	Earlsboro	do	3417–3460	.833	38.4	80	do
27243	Seminole	Cromwell	3503–3517	.832	38.6	80	do
27566	do	Viola	4171–4256	.839	37.2	92	do

Table 1—Sources of Samples, Physical and Chemical Properties

Sample No.	Field	Sand	Depth Feet	Properties of Crude °A.P.I.	%S	Viscosity at 100°F.	Pour test	Gasoline Fraction %	°A.P.I.	Viscosity at 100°F. of Vacuum Fractions 225-250	250-275	275-300	% Carbon Residue of Residuum
27335	Seminole	Wilcox	4136–4138	39.6	0.33	39	(a)	38.6	61.0	61	91	165	7.3
27339	do	do	4128–4129	39.8	.38	38	(a)	40.1	61.0	60	89	165	7.7
27240	Bowlegs	do	4194–4200	38.2	.31	43	(a)	37.1	60.8	58	87	165	6.8
27343	do	do	4111–4134	40.9	.30	38	(a)	39.1	62.9	60	93	175	6.8
27337	Earlsboro	do	4230–4234	43.2	.31	37	(a)	41.3	63.4	61	95	185	6.1
27236	do	do	4257–4283	39.6	.30	46	(a)	34.1	62.6	58	89	165	5.5
27377	Searight	do	4502–4508	37.6	.35	45	(a)	34.7	60.0	62	99	180	6.5
27336	Seminole	Hunton	....	37.8	.28	42	(a)	35.3	59.2	60	95	180	6.9
27381	Searight	do	4055–4155	38.2	.24	41	(a)	36.0	59.5	61	93	185	6.0
27378	do	Earlsboro	3534–3570	38.4	.20	44	(a)	35.8	60.5	63	100	195	5.3
27379	Earlsboro	do	3417–3460	40.2	.25	42	(a)	37.9	62.6	61	95	185	5.4
27243	Seminole	Cromwell	3503–3517	37.8	.14	47	(a)	32.3	59.5	61	91	165	5.1
27566	do	Viola	4171–4256	36.2	.47	45	(a)	34.7	56.7	60	91	168	10.5

(a) Below 5° F.

Guaranteed 100% PURE PENNSYLVANIA OIL

CORECO

Guaranteed 100% PURE PENNSYLVANIA OIL

A Super Pennsylvania Motor Oil For The Independent Jobber

Since 1885 we have been refining "The highest grade crude in the world." We even refine this crude to so high a degree of perfection as to produce a Super Pennsylvania Motor Oil.

Compare the specifications of our CORECO MOTOR OILS with those of ANY oil you may choose.

	GRAVITY	FLASH	FIRE	VIS. @ 100	VIS. @ 212
Coreco Light	30.3	440	505	235	49
Coreco Medium	29.8	450	520	390	60
Coreco Heavy	29.0	465	540	700	75
Coreco Ex. Heavy	28.1	485	560	1065	97
Coreco Spec. Duty	27.8	495	575	1425	106

CORECO affords a profitable business building opportunity for the independent jobber and our CORECO exclusive territory contract is as attractive as are the specifications of our Super Pennsylvania Motor Oils.

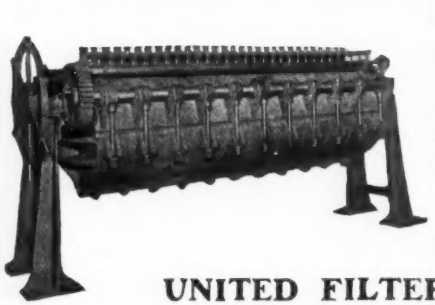
CORECO distribution is available to independent jobbers and distributors only. Attractive territories for exclusive distribution are still open in some very productive districts, which will be granted to reliable jobbers.

Write our Main Office for further details.

THE CONTINENTAL REFINING COMPANY

Main Office and Refinery, **Oil City, Pa.**

The Most Important Machine



FILTERING is the key step in the contact process. The filter is the key machine.

It is important that this machine be right. Sweetland Filters —which made this process practical—should be bought from the manufacturer.

New Filters carry the manufacturer's guarantee.

UNITED FILTERS CORPORATION

Hazleton, Pa.—Los Angeles Office, Central Building
Other Offices in Chicago—New York—Salt Lake City
Export Office—25 Broadway, N. Y.—Code Address, Unifilter, New York

analyzing crude oil see Bulletin 207.[2] For a discussion of the interpretation of crude oil analyses, see Serial No. 2806.[3] Table I summarizes the results of these analyses by presenting some of the figures indicating physical and chemical properties of the crudes. Table 2 presents figures for the gravities of the fractions distilling at atmospheric pressure between 250 and 275 degrees Cent. and also the cloud points of the fractions distilling between 275 and 300 degrees Cent. at 40 mm. absolute pressure. These figures indicate the "base" of a crude oil.[3]

Although there are a number of producing sands in the Seminole District, it does not seem possible to ascribe definite and distinctive characteristics to the production from any of the sands. The Wilcox is the most productive sand in all of the pools in the district. On the basis of the samples that the Bureau of Mines has analyzed, (not all of which are included in the report) the gravity of crude oil from the Wilcox sand in this district ranges from 37.6 to 43.2 degrees A.P.I., with the average about 40 degrees A.P.I. The sulfur content ranges from 0.26 per cent to 0.43 per cent with the average about 0.33 per cent. The gasoline and naphtha content ranges from 34.1 per cent to 41.3 per cent, with the average about 38.4 per cent. The production from the Hunton lime ranges in gravity between 37.8 and 40.4 degrees A.P.I., with the average about 38.8 degrees A.P.I. The sulfur content ranges from 0.22 to 0.30 per cent, with the average about 0.26 per cent. The gasoline and naphtha content of the crude from the Hunton lime ranges from 34.7 to 37.3 per cent, with the average about 36.0 per cent.

TULSA, Oct. 14.—V. N. Lee has been elected general manager of the Acme Tank Car Co. of Coffeyville, Kan., it was announced this week by E. L. Graham, president. The change was effective Oct. 1.

Mr. Lee formerly was secretary. He has been in the tank car repair business in an active capacity for 10 years

---

LOS ANGELES.—The last of the civil suits against the Pan American Western Petroleum Co. in the Elk Hills naval reserve lease cases has been dismissed after Judge Paul McCormick of the U. S. district court ruled the Pan American was not required to pay interest on the money the company was ordered to pay the government in the decree of May 10, 1927.

---

2. Bureau of Mines Bulletin 207, "The Analytical Distillation of Petroleum and its Products" by E. W. Dean and others. Obtainable from the Government Printing Office, Washington, D. C. at 15 cents a copy.

3. Smith, N. A. C. The Interpretation of Crude Oil Analyses, Reports of Investigations Bureau of Mines, Serial No. 2806, May, 1927.

Automatic Control of Furnace and Tower Temperatures in Refineries

By F. M. Poole

District Manager, Brown Instrument Co.

FOR purposes of consideration, I am separating the problem of temperature control into the application to the fuel supply to your furnace, whether it be a pipe still, cracking still, or lubricating unit, and to your fractionating towers, or in other words, to the "input" and "output" of your plant.

Furnace Applications

In the past, when automatic temperature control has been applied to a furnace, it has been of the "off and on" type. This usually comprised a pyrometer actuated from a thermocouple, located either in the oil path or the furnace combustion chamber, which is made by means of a high and low contact in the instrument, to open or close the valve in the fuel supply to the burners. This means that the fuel valve was either in one position or the other. This excludes the so-called thermometer air type controls which cannot be used to control from furnace temperatures, and only within a limited range from oil temperatures.

This type of control is similar to that used in other industries such as the heat treating. In such industries, this type of control is used with satisfaction. The reason is that the temperature changes required are usually marked and rapid, and the time required for treatment is relatively short. The "off and on" control, when applied to the oil industry, has done the work required but its adaptation has not been as complete as in other industries.

Some of the limitations of the "off and on" controls are:

(1) If the thermocouple is located in the oil outlet, to keep the temperature fluctuation within narrow limits, there is required considerable difference in adjustment between the open and closed positions of the valve. This means: (a) The furnace masonry and tubes are subjected to an alternate heating and cooling, which, if too great, is not conducive to long life or minimum repair. (b) The danger of over heating a tube is material.

(c) The possibility of the oil temperature "riding high" for a short period is increased, particularly, if the rate of charge is temporarily decreased, due to the slowing of the pump. (d) In the case at a cracking still, this "riding high," or peak temperature, results in a greater deposition of coke.

(2) If the thermocouple is located directly in the combustion chamber to keep the temperature fluctuation within narrow limits, there is required to a lesser extent the same difference between the open and closed position of the fuel supply valve. To a lesser extent, the same undesirable characteristics are possible.

(3) In too many cases, whether the thermocouple is located in the oil outlet or combustion chamber itself, it is practically impossible to introduce the proper amount of air for good combustion, for both positions of the control valve. This results oftentimes in an insufficient amount of air for the open position of the fuel valve, with the resulting increased deposit of soot on the tubes. Such increased soot deposit, as you all appreciate, means a decrease in the rate of heat transfer, resulting in waste of fuel.

SOME of you gentlemen have seen such "off and on" controls applied to furnaces, or have them in your own plant. You have appreciated the limitations and value of such "off and on" control. You have used them, principally, to minimize the human factor altho your firemen may have become what you regard as proficient in controlling your furnace and still temperatures.

Is the evolution of furnace control to stop here?

You gentlemen know that it is possible for your firemen to obtain such proficiency that they can obtain a straight line oil outlet temperature for a majority of the time. Whether it is due to the "human equation," or other causes, there are periods in every fireman's life, when he does not give the still the attention he should. Assume that the fireman's "off day" occurs only one out of 20, think what it would mean, if on that day he allows your yield to drop to 5 per cent, or allows your coke deposit to increase for an appreciable portion of that day. On the basis of the average yield in a small plant per day, the preventive loss would be sufficient to pay for the automatic control the first day.

The above statement does not take into consideration that a cracking still operated at as high an oil temperature as possible, without undue deposition of coke, is assumed to give a better gasoline product of anti-knock qualities.

An automatic furnace control, by eliminating the human equation, can permit you to operate consistently nearer the danger point, where excessive coke deposit begins, than you would dare to do with hand control. This makes it possible for you to get a better quality product than by hand control.

IN CASE of a crude pipe still, you can appreciate from your own knowledge that: (a) A drop in the oil outlet temperature materially affects your yield (b) An excessive oil temperature is apt to overload your fractionating equipment. If an automatic control can assist you in eliminating those ill effects of the human equation —even though they occur only one day out of 20—it is worth while.

I have outlined the limitations in my opinion, of automatic controls for furnace temperatures as they now appear on the market. What type of mechanical and electrical design in automatic control should you expect to eliminate the above limitations? What is the best method of controlling a furnace? Shall it be directly from the oil outlet thermocouple actuating the furnace fuel supply, shall it be from the furnace thermocouple actuating the furnace fuel supply or shall it be the combination of both?

Based upon the observations from extensive tests and development work on automatic furnace control made during the past several years, it is my opinion that the most desirable furnace control should be made up as follows:

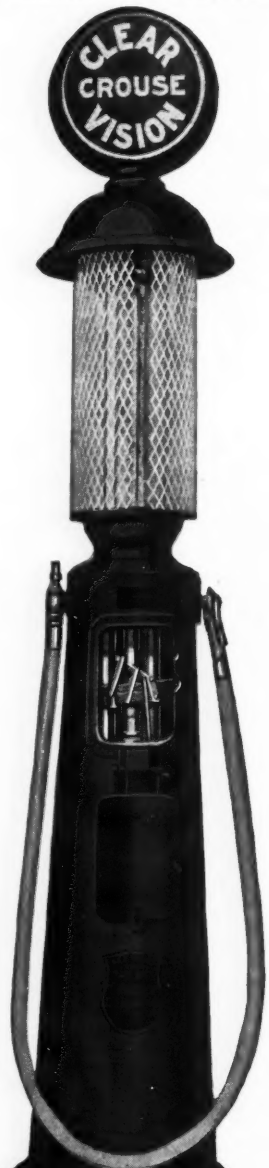
(1) A control pyrometer actuated from thermocouples in the combustion chamber should vary the amount of fuel to the furnace burners to give a constant furnace temperature regardless of oil through-put.

(2) It is desirable to have an auxiliary control pyrometer actuated from the oil outlet temperature, or an intermediate point between the outlet and oil inlet. This should arbitrarily vary the rate of charge to iron out small fluctuations in the oil outlet temperature. This is particularly desirable where it is impossible to maintain an absolute constant rate of charge because of the varying speeds of the charge pumps.

Varying the rate of charge to iron out small fluctuations in the oil out-

CLEARVISION

Dominant in Service



There is Only One CLEAR VISION PUMP

Made by the

CLEAR VISION PUMP COMPANY
of Wichita, Kansas

Pacific Coast Factory
1165 W. Ocean Ave., Long Beach, Calif.

Manufacturing and stocking a complete line of Clear Vision equipment—easily accessible to the West Coast trade.

SEND FOR CATALOG

let temperature, is suggested because the response is much more rapid. It has been shown that in a pipe still of average size and thermal capacity, varying the rate of charge will affect the oil outlet temperature about three times as fast as varying the furnace temperatures.

Such auxiliary control would also serve to eliminate other temporary factors likely to upset the oil outlet temperature, such as change in inlet oil temperature, a rain storm, etc.

(3) Instead of the furnace control described in No. 1 and auxiliary control described in No. 2, a control pyrometer actuated from a thermocouple located in the oil outlet or an intermediate point between the oil outlet and inlet, can be used to vary directly the fuel supply to the furnace burner. This type of control is best adapted to small units having high rates of charge with resulting less amount of lag.

The mechanical and electrical design of the controls described above should be such as to give the following characteristics:

(1) Maximum sensitivity.

(2) Adjustment of fuel burners at frequent intervals but in small increments.

(3) Adjustments proportional to amount of temperature divergence from the desired control point.

(4) Capacity of the instrument to "ease off" any adjustment at the instant temperature fluctuation stops and begins to recede toward the control point.

(5) Means of adjusting such capacity to recede in accordance with the lag present in the unit being controlled.

A control having the above characteristics would approximate the best manual control of an intelligent operator with his hand constantly on the control valve and his eye on the pyrometer. There would be no alternate heating and cooling of the furnace masonry and tubes or an excessive soot deposit due to incomplete combustion. Fuel economy would be the maximum.

I believe you will agree with me, that with an instrument so designed, an automatic control for furnace temperatures is desirable. It would eliminate the losses due to the human equation in hand operation.

Tower Application

TO DATE, automatic controls for fractionating towers, have been of two classes: the "off and on" type, and the so-called throttling type. Both pyrometers and thermometers, working on the principle of the "off and on" adjustments of the reflux valve, have been applied to towers. Heretofore, the throttling type has been confined to a thermometer control using compressed air as a source of power.

To apply successfully automatic temperature controls to the towers, several factors must be taken into account.

(1) The thermal conductivity of the vapors at the outlet of the tower and therefore the rate of heat transfer is relatively small.

(2) The velocity of the vapors in the tower and leaving the tower is high.

(3) The ability of the vapor, coming up thru the fractionating column, to "reflux" is a function of the vapor pressure and a change in vapor pressure, particularly a temporary or pulsating change in vapor pressure. Minute changes in vapor pressure have material effect.

(4) Fractionating columns as made today have a considerable thermal capacity.

The automatic temperature control which is going to prove to be best adapted to fractionating towers must have maximum sensitivity. It is very important, especially in view of the low rate of heat transfer and high gas velocity, that the control not merely record the mean temperature between minute fluctuations, but that it have sufficient sensitivity to pick up the trend of temperature, in the minute stage, where such trend is forming. If such trend of tower temperature is used as the basis of tower control, and not the mean temperature of minor fluctuations, a more consistent vapor temperature is possible.

The reason for this is that the tower is not allowed to gather "momentum", so to speak, as it would if the control were actuated from the mean of temperature fluctuations. It too often happens that if a tower is allowed to gather "momentum," even for such a short interval of time, the tower temperature is apt to go off on a tangent, which would require hours to bring it back into balance at the desired temperature.

THEREFORE the fundamental requisite of a satisfactory tower control is to pick up the trend of tower temperature at its minute stage.

It follows therefore, that basically, the pyrometer is the best adapted instrument for tower control, as compared with the thermometer, whether gas-filled, vapor tension, mercury filled, or electric resistance type.

The reason for this should be readily apparent by comparing the sensitive portions of a pyrometer and thermometer. The thermocouple, the sensitive portion of a pyrometer, can be made of very fine wire, 25 gauge or less. It can be placed so that it touches the bottom of a thin walled well made of high thermal conductivity material—such as aluminum bronze. The bulb, the sensitive portion of a thermometer, must be much larger in size and placed in a second well. In the case of the thermocouple, the

effective thermal capacity is almost negligible as merely the tip end of the thermocouple must be brought to the temperature to be measured.

In the cast of the thermometer, the mass, and therefore, the thermal capacity is much greater. The heat from the tower vapors must travel thru the outer well, the separating film between the well and the bulb, and thence into the liquid or gas inside the bulb. This entire mass must be brought to the temperature to be measured.

There is no better illustration of the sensitivity of the pyrometer than that of applying a match to the thermocouple. Some of you gentlemen know that a match contains a thermopotential of from 1200-2000° Fahr. If you attempted to register that potential on a thermometer, you would do well to get 300° Fahr. I have brought with me a standard indicating pyrometer and a fine wire thermocouple similar to that used in a tower. Please note that the sensitivity of the pyrometer is sufficient to pick up a temperature change by merely passing the match back and forth under the thermocouple. If I leave the match under the thermocouple, I can easily read 1200-2000° Fahr., the potential of the match.

ANOTHER requisite of a satisfactory automatic temperature control for towers is that any adjustment in the reflux which it makes, must be done gradually. The "off and on" type of tower control permits; first, a large amount of reflux, and second, a small or even no amount of reflux to be emitted at the top of the tower. This is commonly described as the "feast and famine," type of control.

Such "feast and famine," in the reflux is apt to cause a decided cooling followed by the heating of the vapors coming up thru the fractionating column. This results in an accompanying change of the vapor pressure in the different parts of the fractionating column. This means that the lighter ends are being pulled down and held in entrainment by the liquid form. In the case of the heavier molecules condensing into "famine," the heavier ends are allowed to go over when they should have been thrown back. To reduce this ill effect, the amount of liquid in the trays has been increased by tower designers. This increases the thermal capacity and in consequence the lag.

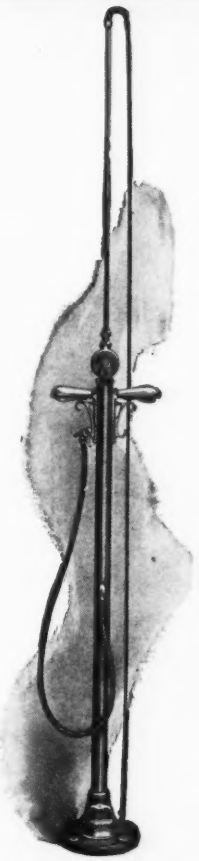
You gentlemen are probably well acquainted with the fact that it is possible for you to run 25° Fahr. high in your tower temperature followed by 15° to 20° Fahr. low as compared with that temperature which will give you 437 end point and still have the distillation curve of the sample of your product from the run down tank check at 437 end point. It has been stated that

CHAMPION

equipments are the standard of quality in the service and filling station field.

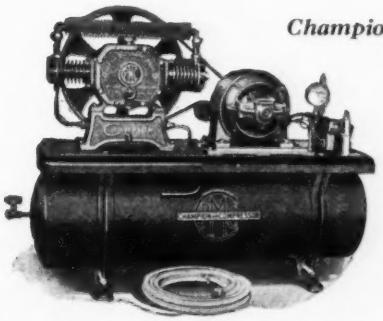
Such features as sturdy design for long life—no delicate parts—fool proof—quiet operation—low operating cost—few and very inexpensive replacements are to be found in all Champion equipments.

These advantages coupled with an unusually attractive first cost is the reason why thousands of stations are fully Champion equipped.



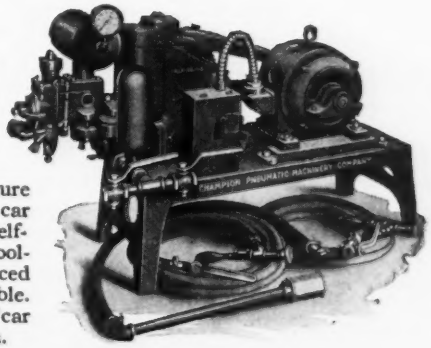
Champion Air Towers

Four styles embracing many new and exclusive features. Built to last—nothing to wear out—and priced very low. Write for special "Air Tower" bulletin.



Champion Air Compressors

Single and Two stage units. Automatic, quiet running, low operating cost and extra long life. Ball bearing equipped. Many sizes and styles—priced to fit your need. Write for compressor catalog.



Champion Car Washers

Efficient, low operating cost. Built in two sizes with ranges in pressure to cover every car washing need. Self-oiling and fool-proof. Yes—priced very reasonable. Write for "car washer" bulletin.

CHAMPION PNEUMATIC MACHINERY CO.
8168 So. Chicago Ave. Chicago, U. S. A.

Oil And Grease Formulas

200 formulas, have been prepared in a simple, non-technical style by Forrest A. Hoff.

They are of value to the refiner, jobber, compounder, broker and lubricating engineer.

Just attach your check to this ad and return it to us now. $15 is the reasonable cost of all this information. Synopsis sent upon request.

National Petroleum News
1213 West 3rd St. Cleveland, Ohio

Sample Oil Bottles

Made the Way You Want Them Made

CLEAR and clean of finest perfume glass with ground or polished bottom—to tell the truth and nothing but the truth.

Sturdy and carefully annealed—to stand hard knocks and still be "all there" at the finish.

Well designed at mouth —to take and hold the cork with bulldog grip.

Available in plain styles or with your name blown in the glass.

Sizes 2, 4 and 8 oz.

Sample on request.

Illinois Glass Company
Alton Ill.
ESTABLISHED 1873

this paradoxical condition is true only because your laboratory distillation test is made upon a comparatively small sample. The heavier ends remain as a vapor in the bottom of the neck of the distillation flask and do not affect the thermometer.

IN THESE days when the small losses are being considered, it is desirable to eliminate that small amount of dilution and thus increase the anti-knock qualities of your product. Suppose this dilution equals only 1 per cent. That is only a small part of a 100 cc sample but in a month's run it is material. Automatic tower control by better attention to this last 10 per cent of fractionation than is possible by hand control, can keep out this heavier end dilution.

We have the general statement made that an automatic control by eliminating the human equation in tower manual control can decrease the per cent of preventable loss in yield.

To give you a tangible idea of what these losses can amount to, I have taken an average tower temperature record which has been manually controlled and plotted a portion on a larger scale.

Please note that for 12 hours the total number of hours of the run, the temperature fluctuated as follows:

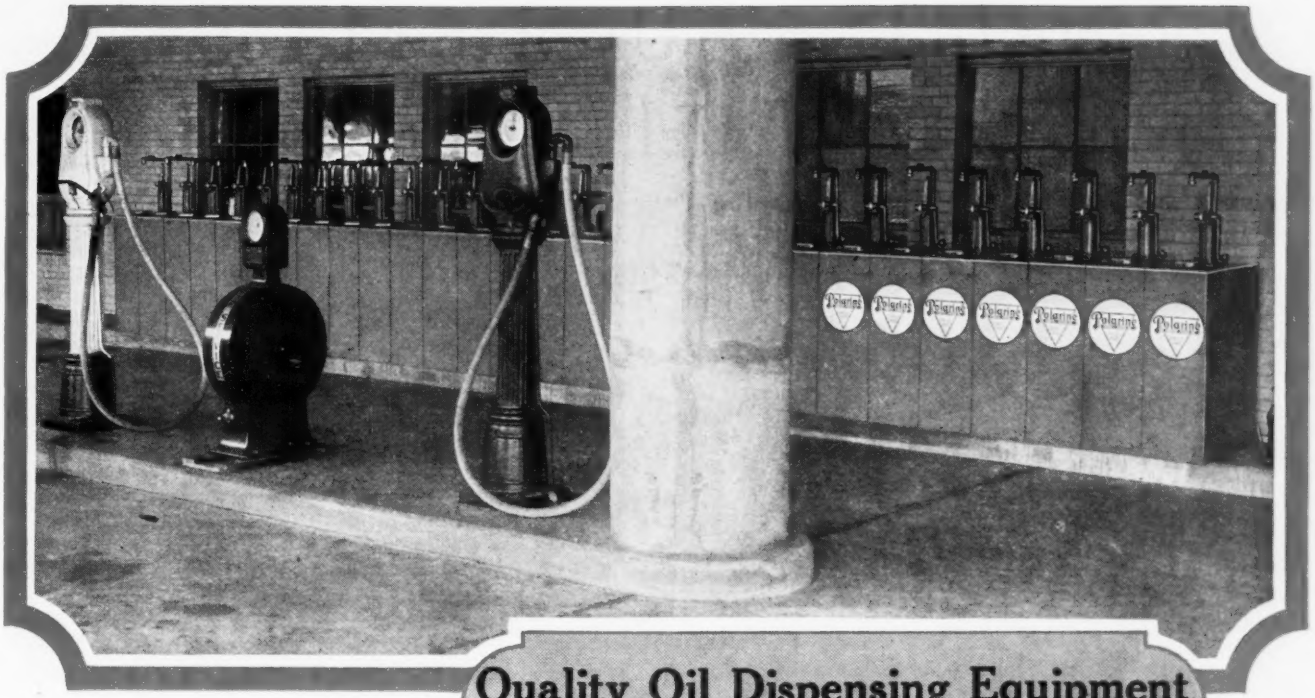
1/3 hour 20° high or 3% of total time
1 hour 15° high or 8% of total time
1¼ hour 10° high or 11% of total time
2 hours 5° high or 16% of total time
6 hours 5° low or 50% of total time
5½ hours 10° low or 45% of total time
5 hours 15° low or 41% of total time
2½ hours 20° low or 20% of total time
1 hour 23° low or 8% of total time

By comparing the above table, which might easily be the fluctuations of a tower under manual control on a crude still or a pressure still, with the distillation curve of a benzine stock run above 437 end point or a pressure distillate, you can note the per cent loss in yield due to carrying the temperature too high or too low.

From this you will see that if the tower temperatures were held with 50 per cent less fluctuation, the increase in yield would be sufficient to buy several automatic controls.

The type of mechanical and electrical design of the automatic control best adapted for towers is not unlike that described for furnace control. You can readily appreciate that a tower control having the characteristics described above for furnace control would give you maximum sensitivity with the elimination of the "feast and famine" and the resultant partial pressure pulsations through the fractionating columns. You could expect the yield to be greater. You could expect to balance your entire unit and keep it balanced with greater ease.

I wish to acknowledge the assistance of Doctor Crose of the Kansas City Testing Laboratories in confirmation of the data on distillation included above.



A battery of 28 60-gal. units with OPACO Master Pump. The new Union Station Garage, Jackson Blvd., Canal and Clinton Sts., Chicago. One of the largest and finest equipped garages in the United States.

OPACO Quality is an Everlasting Investment

Quality Oil Dispensing Equipment Is Coming Into Its Own!

Traveling hand-in-hand with the tremendous growth of the oil industry has been the ever increasing demand for oil dispensing equipment for use both in the privately owned and company owned filling station. It is doubtful that the prices prevailing today on dispensing equipment would have reached their present level were it not for the large volume of equipment of this type that is put out on loan agreement and not purchased for use in the filling station by the owner himself.

It is not to be inferred from this that all purchases in the past have been on the basis of price alone as the more careful purchaser has always insisted on a dollar's value for every dollar expended and is giving the same careful consideration to the cost of upkeep as to the initial investment. He fully realizes that it is just as important that he furnish the jobber with attractive and dependable equipment for the vending of a quality product as though the equipment is for use in his own super-station.

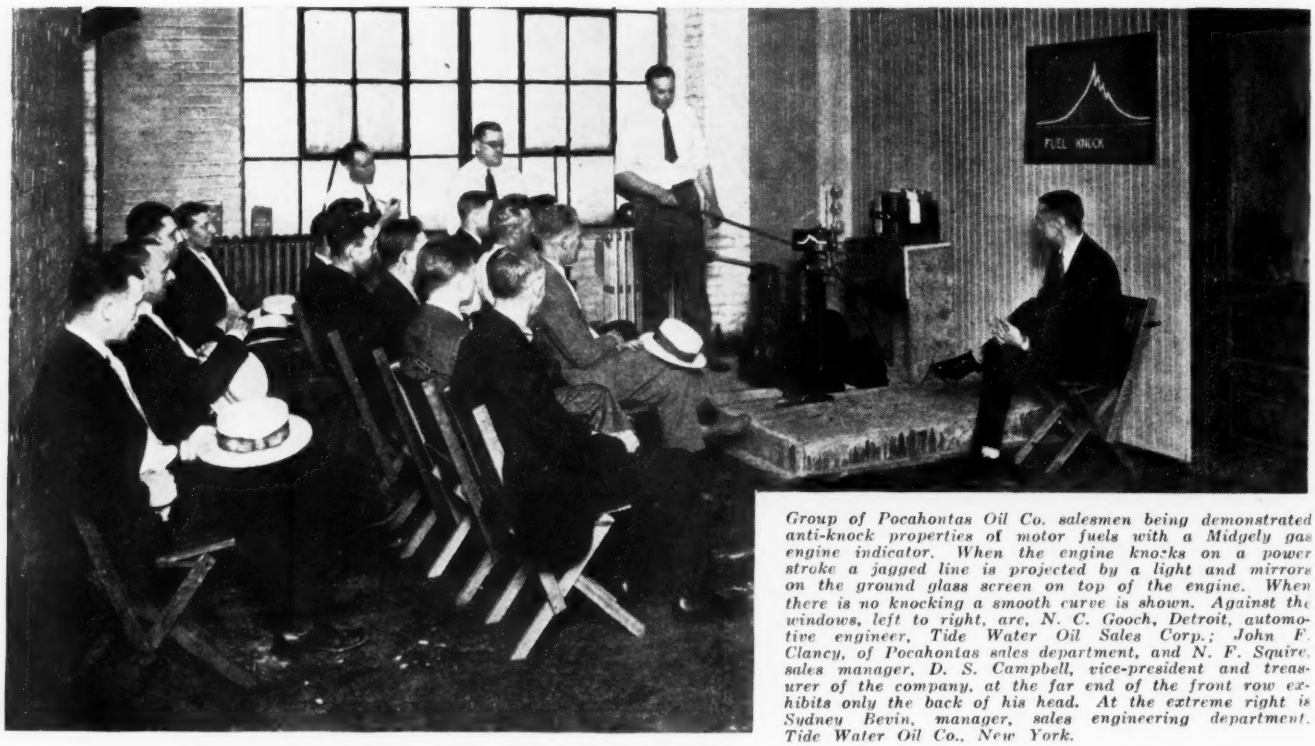
It is nevertheless astounding to note the millions that have been yearly expended by less farsighted purchasers on equipment where neither samples nor specifications were desired and where price alone prevailed. Such a policy cannot be to the interest of the oil company that is looking towards the future of its business. For this same reason the production of the cheaper class of equipment cannot be to the best interests of the farsighted manufacturer. To quote John Ruskin, "There is no article made that someone cannot make worse and sell for less."

The oft repeated expression, "If it pumps oil, it is good enough", can hardly be understood regardless of whether the equipment is for loan or for use in the super-station of the owner himself. When inferior, leaky or otherwise defective equipment is handed out to the operator, he sometimes stops a sufficient length of time to "cuss out" the pump and its manufacturer, but it is more often the oil company, which has prevailed upon him through its ever repeated claim of quality products. It is gratifying to note, however, that the purchaser is coming more and more to recognize the sales psychology in dispensing quality products only through the medium of Quality Equipment of attractive appearance.

The Quality in OPACO Oil Dispensing Equipment is Now Coming Into Its Own.

OPACO

Midgely Indicator Used to Merchandise Anti-Knock Fuel to Auto Dealers



Group of Pocahontas Oil Co. salesmen being demonstrated anti-knock properties of motor fuels with a Midgely gas engine indicator. When the engine knocks on a power stroke a jagged line is projected by a light and mirrors on the ground glass screen on top of the engine. When there is no knocking a smooth curve is shown. Against the windows, left to right, are, N. C. Gooch, Detroit, automotive engineer, Tide Water Oil Sales Corp.; John F. Clancy, of Pocahontas sales department, and N. F. Squire, sales manager, D. S. Campbell, vice-president and treasurer of the company, at the far end of the front row exhibits only the back of his head. At the extreme right is Sydney Bevin, manager, sales engineering department, Tide Water Oil Co., New York.

CLEVELAND, Oct. 21

WHEN Pocahontas Oil Co. began to market Ethyl gasoline a few weeks ago it conducted a school to acquaint its station salesmen with the new goods and then gave a series of merchandising demonstrations of anti-knock performance of Ethyl in a high compression engine for the automobile dealers and service men of Cleveland and surrounding territory.

Pocahontas officials have long recognized that selling the consumer is only the final link in a chain of sales from the manufacturer or refiner to the person that uses the product. Selling the salesman who sells the customer is important if intelligent service is to be rendered the public and goodwill built for the company. So whenever Pocahontas decides to market a new product it educates the station salesmen about that product so they may present it intelligently to the motoring public.

A Midgely gas engine indicator, the bouncing pin device that Thomas Midgely, Jr., inventor of Ethyl gasoline, invented to demonstrate this anti-knock motor fuel in its infancy, was borrowed from the Tide Water Oil Sales Corp. and set up in a building convenient to Cleveland's automobile row.

Squads of Pocahontas service station salesmen were brought to the school and shown how the engine—a Delco farm lighting unit with the compression increased to 100 pounds per square inch, or slightly more than the 6 to 1 compression of the new automobile engines—worked with various grades of gasolines purchased on the Cleveland market and then with Ethyl gasoline.

They were given a list of 48 questions and answers concerning Ethyl gasoline. This list was an adaptation of a list compiled and answered by the Ethyl Gasoline Corp. last spring. The adaptation was to impress on Pocahontas station men that the company's Blue Flash Ethyl was something different from ordinary Ethyl. Blue Flash, the company's competitive grade, is a gasoline with low initial boiling and end points. Until a year ago it was marketed as a high test gasoline but beginning last fall it has been sold at the competitive price with one big exception—there are no cash discounts on it and coupon books equivalent to a 2-cent-a-gallon discount are no longer sold by the company.

N. F. Squire, sales manager of Pocahontas, and John F. Clancy, of the sales department, conducted the classes and gave the demonstrations. H. C. Gooch, Detroit, automotive engineer in the employ of the Tide Water Sales Corp., also participated and took photographs of the firing curves of five types of motor fuel that are on the Cleveland market.

One of the five types was described as "bootleg" gasoline. It was bought at a cut price station. It showed a sharp jagged line on the indicator. Another fuel was a U. S. Motor gasoline marketed by one of the large companies. Its anti-knock property was low. The third was a doped fuel that recently appeared to compete with Ethyl and other anti-knock fuels. It knocked a great deal and with it the power stroke of the engine recorded a jagged line.

The fourth sample was a premium grade of cracked anti-knock gasoline which made a more favorable demonstration but had occasional knocks in the 100-pound compression engine. The fifth was Blue Flash Ethyl, which did not knock and gave a smooth curve on the indicator.

Some of the automobile men were skeptical at first but were finally convinced that no tricks were being played to cause the engine to hammer much louder than a bad knocking automobile engine.

Brand names of the various fuels except the company's own gasoline, were not disclosed, only the types of fuel being described. The company also let the demonstration be its own salesman.

Automotive and mechanical engineers and chemists who are interested in the automotive industry were later invited to the demonstrations and many went to see the Midgely indicator and its visualization of the anti-knock properties of motor fuels.

Bulk Stations Started in Buffalo Thrive There Now

Bulk service station of Niagara Gasoline Co. at Newark, Del., an outgrowth of the Larkin idea in Buffalo. This station is owned and managed by Buffalo men. The tank which is used for advertising as well as a gasoline container, holds 20,000 gallons. The space between the concrete piers that support the tank, is used for storage. The railroad siding is just beyond the cluster of bushes at the right center of the picture

BUFFALO, N. Y., Oct. 21

BUFFALO is believed to have been the birthplace of the idea for service stations with tank car storage. This fact cannot be definitely ascertained, but it is indisputable that the city has been a capable incubator and brooder of bulk stations.

The first bulk storage service station here is now in its seventh year and more has been written about it in the last three or four years than probably any other service station in the United States. It was built and is still being operated by Larkin Co., mail order soap manufacturer since before the days of yellow oak furniture and Morris chairs which it gave as premiums.

Although there are 30 or more bulk storage stations in Buffalo, Larkin has never lost its dominance of this field. It still undersells the market of the large integrated companies by 4 and 5 cents and most of its bulk station competitors by 1 cent.

Larkin now has two bulk stations in Buffalo, the original station in the rear of its large warehouses and works on Seneca street and another at its pottery in the eastern part of the city. A third station is being constructed.

It has one bulk station in each of Rochester, N. Y., Erie, Pa., and Peoria and Decatur, Ill., and two in Toledo, O.

The code of the Larkin company in the operation of the gasoline and oil stations is "Serve the public quality quickly and not too expensively." "This will get the business," said a Larkin official who has been close to the service station business since it was begun in 1921. Serving "quality quickly" needs no explanation to the gasoline and oil distributor. "Not too expensively" is an injunction of wide importance and explains in a phrase why Larkin even in the year of tight gasoline markets—1922—was able to undersell all its competitors, then confined almost wholly to the old line companies. Larkin has never showered money into station buildings. It has put in serviceable structures but its stations, at least those in Buffalo, would never win a Chamber of Commerce prize for good architectural design.

Its pumps and other equipment has been of the very best because it has sought to serve its patrons quickly at a low cost with a minimum of maintenance expense.

It gives no extras in its service which often add to the expense of selling gasoline and oil, such as an attendant to inflate tires, fill radiators and batteries with water, and wipe windshields and windows. It drains crankcases free and refills them with oil at 20 cents a quart. This oil, it advertises, is 100 per cent Pennsylvania. It is compounded at the Larkin plant in Buffalo.

A Larkin official said the company had been forced into the gasoline business, found it could undersell the general market at a profit, and remained in it. He explained that the company early in 1921 was using 2,000 to 3,000 gallons of gasoline a week which was delivered to it by tank truck at 24 and 25 cents a gallon. The company discovered that gasoline at the time cost 16 cents a gallon laid down in tank cars in Buffalo. The company, this official said, proposed to the marketing company from which it bought, that 4 cents margin was ample to net that company a profit, that is that Larkin was willing to pay 20 cents a gallon for gasoline. Its proposition was turned down, he said, and it then decided to put in tankage and put in tank car lots. This it did.

THE company at first sold to its employes, then its employes' friends, and soon the general public. The business has always paid a profit, he asserted, and was not being done solely for advertising purposes. The gasoline and oil department was expanded until today it has seven stations with work progressing on an eighth.

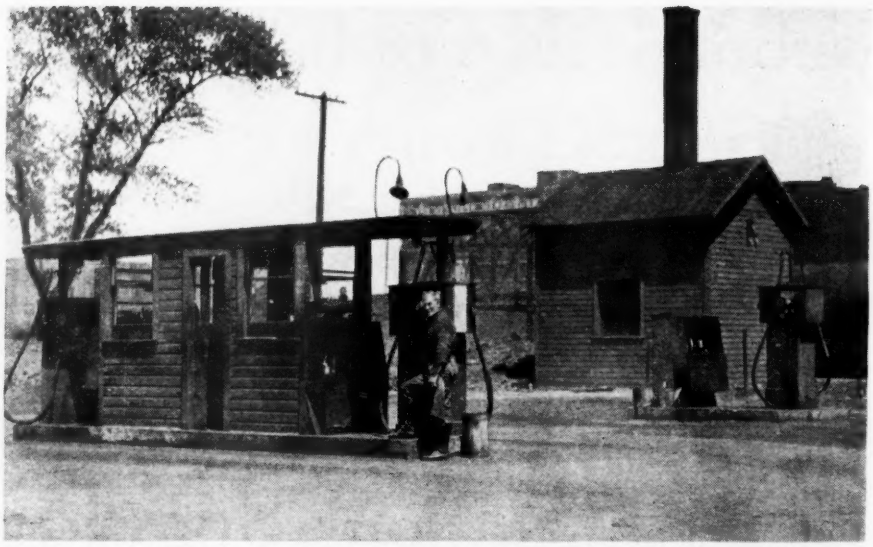
A few industrial competitors have come and gone, among them the Wickwire Steel Co., Lumen Bearing Co., and Dold Packing Co. The Larkin Co. declines to disclose the volume of its gasoline trade but it was said that it was selling about 15 carloads of motor oils a year.

Its gasoline, the official said, must meet all U. S. Motor specifications and a negative doctor test. It also must have anti-knock properties, although no benzol equivalent is specified.

This gasoline has been selling at 13 cents a gallon to all buyers including Larkin employes and some large industrial users whose plants are in the vicinity of the Larkin stations. Except for the industrial customers

the business is strictly cash. The industrials are on a 30-day cash basis, it was said. The Standard of New York sells its Socony gasoline at 18 cents a gallon at its own stations and Socony sells for 17 and 18 cents at Independent stations. The posted tank wagon price is 15 cents. Gasolines that carry the brand of several large companies such as the Tide Water Oil Co. and The Texas Corp. sell at the Socony prices, 17 and 18 cents.

Friday and Saturday before Labor day Larkin cut its gasoline price to 11 cents. This was done to keep the name Larkin on motorists' tongues, it was said. The delivered price of gasoline in Buffalo at the time was around 9½ cents in tank cars. When the writer inquired whether the margin of about 1½ cents would yield a profit, he was informed, "We'll not lose money." That would indicate that Larkin's operating costs run about 1½ cents a gallon on large volume.



The pioneer of bulk service stations: the Larkin Co.'s first station in Buffalo which was opened in 1921. Little money was spent on station buildings but the equipment is designed to handle large volume trade

LARKIN does not set its retail gasoline prices at a fixed margin over the price at which the gasoline costs it laid down at its stations. Retail prices are determined on a percentage basis, but the company would not disclose the factors it considered in reaching what it considers a fair market price.

The company believes, this officer said, that it is doing honest merchandising and earning fair profits on its investment and cost of doing business. Its low prices merely gave the public the benefit of the economic advantage of large quantity buying and selling a large volume at a low price from somewhat inconvenienty located stations.

A. G. Madigan of the Hy-Grade Oil & Fuel Corp., which has both types of service stations, predicted a great change was approaching in the distribution of gasoline. About what the change might be he said he could not venture a guess. He said he was in the position of a patient waiting for the doctor to come to make a diagnosis.

He did say, however, that the oil industry should recognize the fact that the gasoline trade was a trade on wheels; that it could go wherever gasoline was sold to get its fuel, and would likely go where it could get good gasoline cheap. He compared the growth of service stations with groceries. He cited the fact that the automobile was not a consumer of gasoline until it was being driven. It could then go any reasonable distance to get fuel. Two or three or four miles made little difference with most drivers. With the housewife it was different; when she needed groceries she needed them and often did not have a car or the time to go several miles for supplies.

The Hy-Grade company distributes Shell gasoline at the stations in its own name. Through its Prime Gasoline Co. it meets the bulk station competition of Buffalo. At the Prime stations everything is sold entirely on a price basis. Not even the company's name appears in the signs.

The largest exclusively bulk storage organization in the city is the Buffalo Grey Auto Stations, Inc. This company, organized in 1924, has six bulk storage stations in Buffalo and its owers G. P. Manning, president, and C. P. MacArthur, Jr., secretary and treasurer, are interested in the Pro-To-Co Service Stations Co. which has one bulk station here. Messrs. Manning and MacArthur are joint owners of four bulk stations in Detroit, and one each in Albany, N. Y., Troy, N. Y., Lockport, N. Y., and Luzerne and Kingston, Pa., suburbs of Wilkes Barre. The stations are all operated as the Grey Auto Stations with the names of the cities in which the stations are situated as prefixes. Note the initials spell "GAS."

Stations, Mr. MacArthur said, are usually arranged in groups of three so one manager may oversee three stations. However, there are two groups of two, Albany and Troy, and Luzerne and Kingston. The Lockport station really comes under the direct supervision of the Buffalo headquarters.

Each station also has a chief operator who usually has been promoted from the ranks. In summer when more help is needed than in the winter, the extras are recruited from high school and college boys. These boys usually are more polite than the run of young men that seek service station jobs and consequently can measure up to the company's ideas of service morely quickly than if they first had to be taught ordinary etiquette.

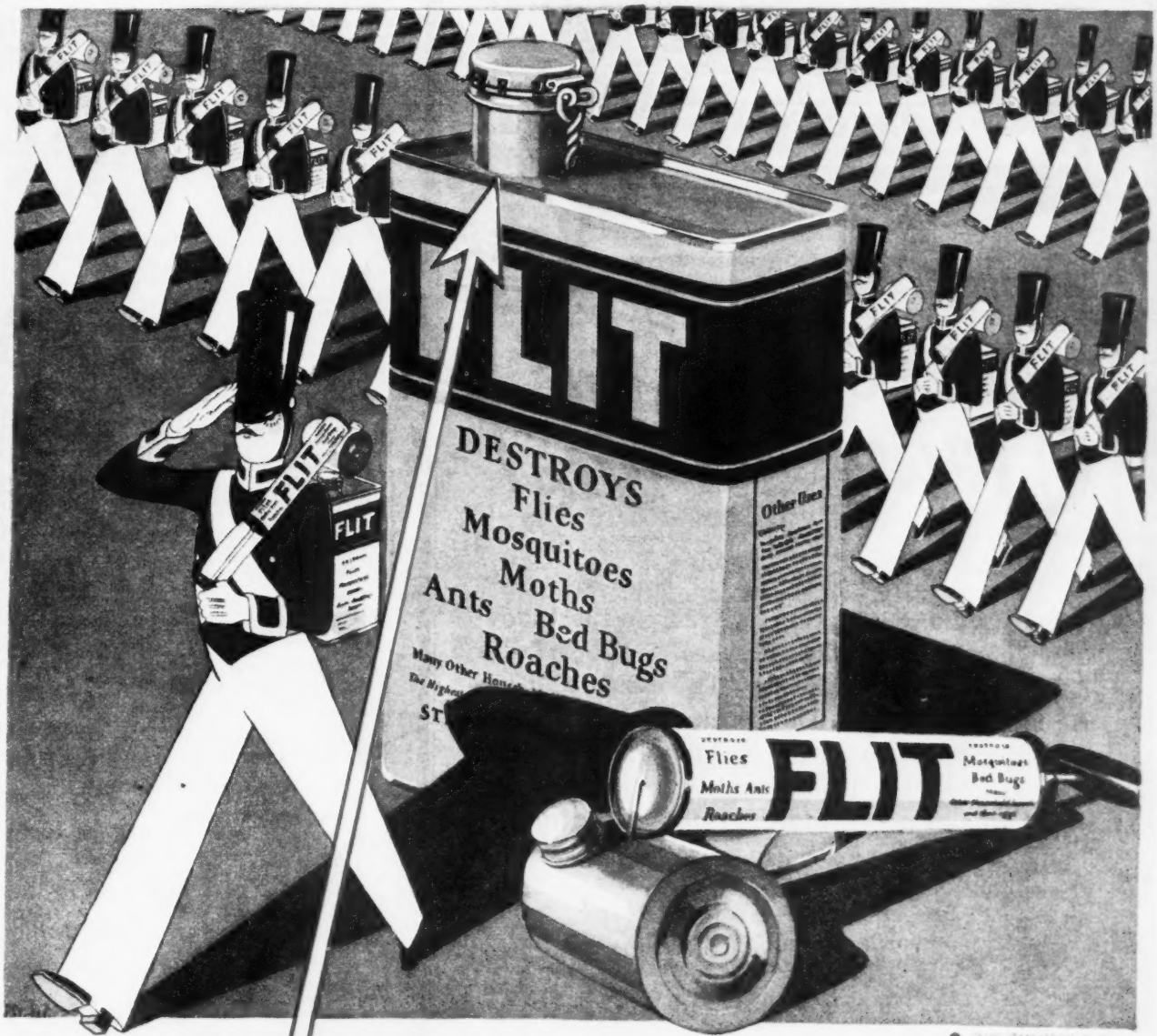
The Grey Auto Stations was organized after Messrs. Manning and MacArthur operated a regular jobbing company in Buffalo from 1921 to 1924. In the latter year they disposed of their bulk and service stations to Swan & Finch Oil Corp.

One bulk station was built soon after the jobbing company was sold and the company had expanded steadily. The Grey stations never have less than 15,000 gallons gasoline storage. The company prefers not less than 25,000 gallons, Mr. MacArthur said, and not more than 50,000 gallons but local conditions sometimes cause changes in tankage volume.

MR. MACARTHUR said he figured that it cost $20 to $30 a day to keep a tank truck on the street. Trucking and other overhead in bulk and service station operation that do not enter into the operation of bulk service stations, cost the jobber around 3 cents a gallon on gasoline, Mr. MacArthur estimated. With the larger volume per unit of the bulk service station, the bulk station gets more gross profit than the old type station even though its prices seem to be lower than the prices of the jobber, Mr. MacArthur said.

The Hamilton Oil Co. is another Buffalo organization with three bulk stations. There are numerous one station operators, as the town is ideal for the development of bulk stations, being criss-crossed by railroads which run even close to the best residential neighborhoods.

From Buffalo also has spread the Niagara Gasoline Co. of which Dean B. Bensley is general manager. This company has bulk stations in Newark, Del., York, Pa., and Millville, N. J., all rather close to Philadelphia. An affiliated company, the Tower Oil Co., recently opened a station at Canandaigua, N. Y., in the Finger Lakes region. Each station is on a heavily traveled highway and each has 20,000 gallons gasoline storage. The Tower Oil Co. built a stone bulk station in Niagara Falls last year which was sold in the spring to the Crew Levick Co.



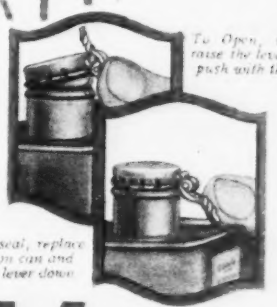
THE HEALTH SQUAD!

Flit kills Flies and

Flies! Mosquitoes, roaches, moths, bedbugs! How people hate them! And, yet, how many still put up with these tormenting pests in their homes—and for no reason! It's a shame. Millions of families ... to enjoy the summer ... breed, destroying ... your garments. Flit ... worms that eat the ... is fatal to ...

Flit is the ... research ...

Just close ... Flit! In a ... home of ... roaches ...



To Open—merely raise the lever and push with thumb

To Reseal—replace cap on can and push lever down

Williams

KORK-N-SEAL

"THE CAN SEAL WITH AN ADVERTISING VALUE"

Williams Sealing Corp., Decatur, Ill.

Empties Clean at any angle!

WHAT a relief it is to be free from the annoyance of juggling the wheels of your Truck Tank to complete drainage. The WELDCO has the exclusive Funnel Drain feature, and *drains to the last drop at any angle.* Custom-built to meet your exact requirements, combining beauty in design with all the essentials for safety, strength and long years of service. Illustrated literature and prices gladly sent.

The Youngstown Welding Co.

Welders Since 1912

Youngstown, Ohio

"Burning Liquid Fuel"

LEARN real facts which have never been published before on the subject of burning liquid fuel, by W. N. Best, the recognized authority.

Send your order and check for $4 to—

National Petroleum News
1213 W. 3rd Street Cleveland, Ohio

Crude Oil Runs For September

HOUSTON, Oct. 13,—Magnolia Petroleum Company, pipeline department, announces from Dallas headquarters the following crude oil runs for September, which are shown in comparison with August:

	August	Septembe
Hewitt-Graham	165,772.04	146,693,8
Healdton	224,725.50	210,279.1
Cushing	149,259.18	139,628.47
Yale	65,184.93	60,279.22
Cement	.....	.....
Duncan	57,785.16	56,797.14
Augusta	46,894.17	46,059.88
Walters-Beaver Creek	9,208.45	8,132.11
Burbank	89.93	82.34
Wewoka	940,406.89	900,200.14
Seminole	34,149.16	79,925.48
Total Okla.-Kans.	1,693,475.41	1,648,077.79
Archer	56,471.03	51,930.09
Burkburnett	83,351.47	79,198.42
Coleman	.....	.....
Comanche	20,528.29	20,354.70
Electra	110,440.28	104,750.56
Corsicana Heavy	9,905.80	8,668.04
Corsicana Light	16,748.51	15,531.78
Henrietta	4,417.04	4,259.54
Iatan	22,338.73	29,868.09
Luling	396,650.15	388,720.67
Lytton Springs	38,175.36	38,691.77
Mexia-Wortham	45,091.56	42,073.98
Mirando	85,822.59	81,770.09
Olden	12,192.52	12,339.41
Panhandle	160,830.96	151,026.51
Panola	1,158.56	1,628.69
Stephens	11,634.37	10,804.28
Thrall	1,375.50	1,313.92
Gulf Coast	9,614.46	6,049.77
Crane-Upton	.....	109,071.23
Total Texas	1,086,747.18	1,158,051.54
Haynesville	3,283.28	2,775.94
Bull Bayou	33,651.16	35,398.81
Cotton Valley	38,225.06	35,745.13
Pine Island	46,443.81	39,741.10
Total Louisiana	121,603.31	113,660.98
El Dorado Light	22,878.78	19,592.58
East El Dorado	.....	2,304.89
Smackover	116,719.98	120,732.58
Total Arkansas	139,598.76	142,630.05
GRAND TOTAL	3,041,424.66	3,062,420.36

OKLAHOMA-KANSAS

Report for September		Daily Average
Runs	1,800,476	60,016
Shipments	1,822,192	60,740
Total Stocks	6,062,711	.....

TEXAS

Wichita, Wilbarger, Archer	Runs	238,325	7,944
	Shipments	194,582	6,486
Petrolia	Runs	4,259	142
	Shipments	4,259	142
Eastland, Stephens	Runs	43,598	1,453
	Shipments	97,132	3,234

TOTAL STOCKS 235,097.00—North Central Texas Field.

Auto Exports' Value Gains 24%

WASHINGTON, Oct. 14.—An increase of $56,469,282 in value, or 24 per cent in exports of automotive products over the first eight months of the record year of 1926, has been made during the first eight months of 1927 when value of exports totaled $287,696,339, according to the Automotive Division of the Department of Commerce.

This is more than 30 per cent above the export values for the entire year of 1924. Steady increases have been made both in passenger car and truck exports, passenger car exports totaling 202,473 in the period of January-August this year, and truck exports 72,719 during the same period.

at the Show

A Complete line of equipment for the up-to-date Marketer

Merit 325 Oval Grease Bucket

The bucket holds approximately 25 pounds of grease. A Merit half pound grease pump is bolted to the cover. Note the corrugated foot hold at the base. It's a snappy unit for snappy service.

Kerosene Outfits

Merit makes a complete line of kerosene outfits in round, square and rectangular tanks of 30-130 gallon capacity with adjustable stop one gallon pumps.

MERIT OIL EQUIPMENT Co.
6616 Morgan Ave., Cleveland, Ohio

Our Industry — A Page of Facts and Personalities

National Petroleum News

By Paul Wagner

OFFICIALS of the Atlantic Refining Co., Philadelphia, headed by J. W. Vandyke, president, and W. M. Irish, vice president, inspected the west Texas properties of the subsidiary Atlantic Oil Producing Co., about the middle of October. They were accompanied on the trip by Dallas officials of the subsidiary company, including E. H. Blum, president.

* * *

BECAUSE present oil fields are largely marine in origin and their yields come from porous rocks that once conformed to the bottom ooze in old seas, the ocean floor is now being studied for the light it may shed on future oil supplies. Brass and iron samplers sent down to obtain sections of mud from the ocean floor by Dr. Parker D. Trask, research associate of the American Petroleum Institute, provide material for laboratory analysis and, to some extent, the actual distillation of oil therefrom. When Dr. Trask completes his reconnoitering trips he will have studied the ocean floors of the Atlantic and Pacific, the Gulfs of Mexico and California and Hudson's Bay. The region giving up the highest return of oil per ton of sediment then will be given more detailed study.

* * *

E. L. COLEMAN, formerly chief clerk under Superintendent Harry McBrier of Magnolia Petroleum Co., at Morrison, Okla., has been transferred to Earlsboro, under Superintendent J. W. Tipton. Roy Wilson, formerly office man at Seminole, will take up outside drilling work. W. G. Crockett, formerly under Superintendent O. H. Stout at Santa Fe, Okla., also has been transferred to the Earlsboro office. Cecil W. Wheeler, formerly assistant warehouseman under Superintendent Le Hudson at Wirt, Okla., is now acting in similar capacity at Earlsboro.

* * *

F. M. TILLOU of the Bayonne Terminal of The Texas Co. expresses an important Safety theme in these words:

"You don't need to get hurt on company property and on company time to hurt the efficiency of your organization, and for this reason companies today carry Safety work outside the plant and even into the homes of their employees."

JOE W. ELSBURY

JOE W. ELSBURY, chief scout of Marland Oil Co. of Texas, Fort Worth, succeeded to his present position about two years ago, when the late Dean W. Cummins was transferred to the Marland pipeline organization as a crude oil buyer. Mr. Elsbury, who had formerly served Gulf Production Co. and other operating interests at field scouting in Gulf Coastal territory, had been Mr. Cummins' assistant immediately prior to his promotion. He is widely and favorably known in Texas territory.

* * *

AFTER President K. R. Kingsbury's recent return from abroad an engrossed copy of the board of directors' resolution on the retirement of Fred H. Hillman as vice president of the Standard Oil Co. of California was presented to the veteran production excutive. The resolution as it appeared on the minutes of the meeting at which Mr. Hillman's resignation was accepted was copied by skillful engrossment upon vellum with the directors' signatures appended and handsomely bound in leather. Mr. Hillman retired last spring after 48 years of Standard Oil Co. service.

* * *

FORT WORTH offices of Gulf Production Co., in administrative charge of F. J. Adams, agent, have been moved from the W. T. Waggoner building to the recently completed Petroleum building.

* * *

SULLIVAN A. MERRITT, formerly identified with Pure Oil Co. operations in the Cabin Creek field, is now production superintendent of the California Petroleum Corp., making his home in the land of oranges.

* * *

L. L. BRUNDRED, an associate vice chairman of the petroleum section of the American Institute of Mining & Metallurgical Engineers, and formerly connected with the National Supply Co., at Houston, is now located in the Petroleum Securities building, Los Angeles, as a consulting production engineer. He recently resigned from the National to engage in private practice after specializing in air-gas lift engineering several years.

* * *

AFTER 20 years service with various companies in which A. D. Morton of Bartlesville had been interested, J. C. Rubel recently resigned as general production superintendent of the Ryan Petroleum Co. He expects to engage in the oil business on his own account.

* * *

RONALD S. MASON now heads the land department of the Sunray Oil Co., Tulsa. He recently resigned from the Tulsa land department of Sinclair Oil & Gas Co.

* * *

E. P. HEILES, secretary of the Empire Gas & Fuel Co., at Tampico, is back in Mexico after a business trip to New York City. L. A. Torres, Empire engineer at Tampico, is back on the job after a three weeks' vacation in Mexico City. R. U. Whetzel, Tampico manager, left for New York early in October.

* * *

PAUL B. REALL of the Cacalillao district production department of Transcontinental Petroleum Co., Tampico, is spending a five weeks' vacation period with relatives at Sistersville, W. Va.

* * *

STEVE WORLEY, formerly Tampico purchasing agent of Huasteca Petroleum Co., is visiting in Panama, accompanied by Mrs. Worley, on their way to Venezuela, where he will be identified with operations of subsidiaries of the Pan American Petroleum & Transport Co.

New Patents

Sept. 27

Refining

Process for Manufacturing Light Hydrocarbon Liquids.—Willis S. Yard and Earl Newman Percy, Oakland, Calif. Filed Mar. 17, 1924. No. 1,643,401.

Process for Treating Petroleum Hydrocarbons.—Walter M. Cross, Kansas City, Mo., assignor to Gasoline Products Co., New York, N. Y. Filed Aug. 13, 1924. No. 1,643,446.

Device for Protecting Condensers.—Arthur G. Bogardus, Chicago, Ill., assignor to The Griscom-Russell Co., New York, N. Y. Filed Feb. 18, 1922. No. 1,643,803.

Producing

Casing Cutter.—Millard S. Black, Huntington Park, Calif. Filed Nov. 18, 1925. No. 1,643,572.

Apparatus for Pumping Oil Wells.—Argus O. Zinn, Los Angeles, and Julien A. Bried, Oakland, Calif.; said Bried assignor to said Zinn. Filed June 7, 1924. No. 1,643,616.

Casing Cutter.—Gerald D. Fawcett, Whittier, Calif. Filed Oct. 5, 1925. No. 1,643,709.

Well Drill.—Charles Wild, Eureka, Calif. Filed Oct. 16, 1924. No. 1,643,730.

Well Boring Machine.—Charles Wild, Eureka, Calif. Filed May 19, 1925. No. 1,643,731.

Corner Brace for Tubular Derrick Girts.—Clyde J. Gougler, Tulsa, Okla. Filed Nov. 25, 1925. No. 1,643,887.

Girt Brace for Derricks.—Clyde J. Gougler, Tulsa, Okla. Filed Nov. 25, 1925. No. 1,643,888.

Tubing Bleeder.—Elmer D. Smyser, Fellows, Calif., assignor of one-third to Roy M. Smith and one-third to Perl E. Williams, Fellows, Calif. Filed Mar. 1, 1926. No. 1,643,908.

Natural Gasoline

Absorber.—Julian A. Campbell, Long Beach, Calif. Filed July 30, 1925. No. 1,643,696.

Process of Manufacture of Carbon Black.—Clyde A. Barbour, Jr., Monroe, La. Filed Mar. 1, 1926. No. 1,643,736.

Miscellaneous

Process of Separating Oily Emulsions.—George W. Coggeshall and Arthur Reilly, Washington, D. C., assignors to The Jefferson Construction and Oil Treating Co., Washington, D. C. Filed Nov. 10, 1924. No. 1,643,698.

Process of Treating Emulsions.—George W. Coggeshall and Arthur Reilly, Washington, D. C., assignors to The Jefferson Construction and Oil Treating Co., Washington, D. C. Filed Nov. 10, 1924. No. 1,643,699.

Attachment for Oil Tanks.—Joseph A. Butcher, Lake Charles, La. Filed May 29, 1926. No. 1,643,833.

Storage Tank.—Edwin M. Clark, Clarkston, Mich. Filed Jan. 24, 1927. No. 1,643,924.

* * *

Oct. 4

Refining

Art of Continuous Distillation of Hydrocarbon Oils.—James Ray Carringer, Elizabeth, N. J., assignor to Standard Development Co. Filed May 6, 1921. No. 1,644,324.

Producing

Drill Bit.—Claude W. Merzger and Margia Manning, Houston, Tex. Filed Dec. 20, 1926. No. 1,644,142.

Oil-Well Derrick and Method of Shortening Same.—William A. Trout, Los Angeles, Calif. Filed Nov. 5, 1925. No. 1,644,499.

Flexible Casing for Oil Wells.—William A. Trout, Los Angeles, Calif., assignor to Emsco Derrick & Equipment Co. Filed Oct. 6, 1924. No. 1,644,553.

Casing-Perforating Device.—Theodore H. Darling, Long Beach, Calif. Filed Sept. 29, 1926. No. 1,644,637.

Natural Gasoline

Treating Gaseous Mediums with Liquids.—Edoards Michle Salerni, Paris, France. Filed Nov. 22, 1926. No. 1,644,089.

Miscellaneous

Method of Manufacturing Oil Gas.—Robert D. Pike, San Francisco, Calif. Filed May 2, 1923. No. 1,644,146.

Boiler for Carbon-Black Retorts.—Harry R. Rogers, Denver, Colo., assignor to Harry R. Rogers, Fred B. Rogers, and William A. Sharpe, Denver, Colo.; Lucian Thomas Martin, Kansas City, Mo.; Albert Lee Miller, Lawrence Johnson, and Lon A. Galbreath, Lusk, Wyo., trustees of The Consolidated Producers Trust, Lusk, Wyo. Filed Apr. 27, 1925. No. 1,644,152.

Quality

REFINING SCIENCE MODERNIZED

SHARPLES PROCESS OILS

Gravity	28½-29	29-29½
Flash	440	430
Viscosity	75 @ 210	60 @ 210
	650 @ 100	385 @ 100
Color	6 plus	5¾
Pour	25/30	25/30

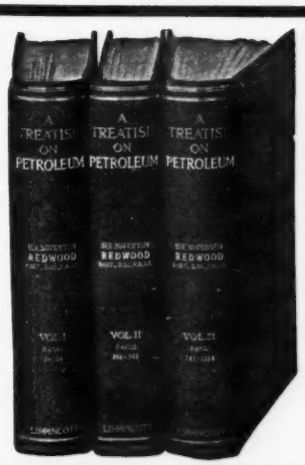
Guaranteed 100% PURE PENNSYLVANIA OIL

FRANKLIN CREEK REFINING CORP.
Franklin, Pa. Permit 34

For Samples and Quotations

W. H. DAUGHERTY & SON REFINING CO
Permit 30 Petrolia, Pa.

SALES OFFICES, 114 FIFTH AVE., NEW YORK



Information on all branches of the petroleum industry is to be found in the 4th edition of A TREATISE ON PETROLEUM by Sir Boverton Redwood.

To obtain this valuable set make your check for $30 payable to

NATIONAL PETROLEUM NEWS
1213 W. 3rd St. Cleveland, Ohio

TRIPLEXD GASOLINE HOSE

All sizes and lengths of Triplexd Hose are carried in stock in these cities:

MEMPHIS: 245 Monroe Ave.
JACKSONVILLE: Dixie Culvert & Metal Co.
ATLANTA: P. O. Box 1343
RICHMOND: P. O. Box 514
BROOKLYN: 236 Tillary St.
BOSTON: 142 Berkeley St.
PITTSBURGH: 341 Second Avenue
CLEVELAND: 1302 Ontario Street, North
CINCINNATI: 450 East Pearl Street
DETROIT: 5459 Grand River Avenue
ST. LOUIS: 1621 Pine Street
KANSAS CITY: 13th Street and Eastern Ave.
CHICAGO: 1213 W. Washington Blvd.
SAN ANTONIO: 1401 South Flores Street
HOUSTON: 700 N. San Jacinto Street
EL PASO: 1020 East Overland Street
NEW ORLEANS: 211 South Peters Street
MINNEAPOLIS: 900 Sixth Ave., S. E.
DENVER: 4800 York Street
SAN FRANCISCO: 873 Mills Building
LOS ANGELES: 1625 South Hill Street
SEATTLE: 67 Columbia St.
OMAHA: 13th & Willis Sts.
TORONTO, CAN.: Dunlop Tire & Rubber Goods Company, Limited
LONDON, ENG.: J. Bazley-White, 3 Love Lane, Eastcheap, E. C. 3

METAL HOSE & TUBING CO. INCORPORATED 236 Tillary Street BROOKLYN, N.Y.

New Equipment to Improve Plants

Personal Notes of the Manufacturers

National Petroleum News

Revolvator Co., Jersey City, N. J., has published a general catalog, section B of which describes its hand power model non-revolvable base portelator, elevators, lifters, stackers, piling and tiering machines. Construction features are pointed out with illustrations and table of dimensions is furnished. The section units of the portelator are electrically arc-welded where practical and the long hinges provide rigidity.

* * *

Allen-Bradley Co., Milwaukee, Wis., maker of electric controlling apparatus, has published a bulletin on its type J-1552 across-the-line motor starting switch, the chief features of which is its economy, protection for men, convenience of push-button control, elimination of production delays and lower maintenance costs.

Regardless of operating conditions the J-1522 switch will take care of them if the motor can be thrown across the line, the company states.

* * *

Ren Manufacturing Co., Winchester, Mass., maker of Ren-locks, is advocating the locking of lamps in moulded, weather-proof sockets to prevent theft and has placed on the market for that purpose a lock which it is making in co-operation with a maker of moulded composition sockets to which these locks can be attached.

Sockets known as Hubbell No. 43310 and No. 60666 are sold with the lock as the only ones to which these locks can be attached.

* * *

The Duriron Co., Inc., Dayton, O., has off the press a 12-page booklet entitled "Duriron in the Refinery." It is devoted to specific applications of Duriron and Alcumite acid-proof metals in treating plants and acid recovery plants.

Duriron is an iron silicide which is said to be more universally resistant to corrosives than any material that is commercially practical. It also resists sulphuric acid of all strengths and temperatures and other corrosives used in oil refineries.

The company also makes Duriron pumps, fans, valves, pipe, fittings, nozzles and similar apparatus to handle corrosives to the best advantage.

* * *

Air Reduction Co., Inc., 342 Madison Ave., New York City, has purchased the oxygen plant, equipment and entire business of the New England Compressed Gas Co., Boston. This new purchase gives the Air Reduction Co. and the Air Reduction Sales Co. production and distribution of 35 oxygen plants in or near the chief industrial centers of the country.

* * *

Fred S. Carver, mechanical engineer at 90 West St., New York City, describes the Carver hydraulic laboratory press as a "giant in power—a pigmy in size." It is only 36 inches high but it can exert a force up to 10 tons. It is designed for use in pressing oil on a small scale, obviating the necessity of running a ton or two of material through large presses.

* * *

Sherwin-Williams Co., Cleveland, O., has just put out a 25-page "painting guide for the petroleum industry" in which complete details of the compositions and uses of various types of paints for various uses in the oil producing and refining industry are furnished by the company's oil industry division.

In the booklet are described the metal protective red lead paints, composite paints, special acid-fume resisting paints, paints for superheated surfaces, tank car and pipe line paints, aluminum paint for storage tanks for the control of temperature, and every kind of paint for about every use in the oil business.

The standardization chart of the Oklatexas Refining Co., which has standardized on paints and varnishes of the Sherwin-Williams Co. is included, as well as illustrations of the use of these paints by various large oil companies.

* * *

Gibb Welding Machine Co., Bay City, Mich., has applied for patents on its welding press which is a combination automatic spot welder and punch press. The feature about the new press is that it makes spots in one hundredth part of a second where the spot welder normally requires one second.

The transformer acts like a condenser discharging its current with great speed. The object of this new principle in spot welding, the company claims, aside from speed of operation, is to make welds eliminating depressions in the surface, warpage and discoloration. The weld is made before the heat has an opportunity to soften the outer surface of the sheet. Welds can be made at the rate of 200 or more spots per minute.

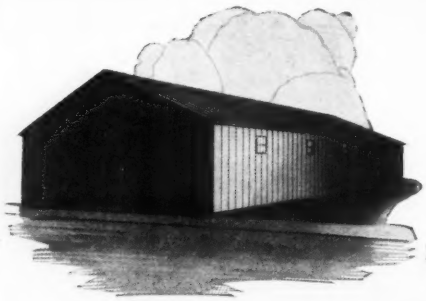
A special application of the welding press is in welding spouts to bodies of oil cans.

TRIPLEXD Will Outlast Any Other Tank Wagon Hose - - - - *and even after that repairs are FREE!*

NOT only is Triplexd built to out perform all other hose for tank wagon use, but Triplexd will continue to serve you long after other hose has been consigned to the scrap heap. Simply return your worn hose to us at Brooklyn, St. Louis, Los Angeles, or San Francisco, and as long as repair is practicable it will be repaired free of all cost other than transportation charges.

METAL HOSE & TUBING CO.
INCORPORATED
6 Tillary Street
BROOKLYN, N.Y.

TRIPLEXD
TANK WAGON HOSE



MARION METAL BUILDINGS

Meet the steel building needs of the whole oil industry

Light, Rigid, Strong and easily erected. Write for complete Catalog No. 7

MARION MACHINE, FOUNDRY & SUPPLY CO.
MARION, INDIANA, U. S. A.

GULF Refining Company

General Sales Offices
PITTSBURGH, PA.

District Sales Offices
New York, Houston, Atlanta, Boston, New Orleans, Tampa, Philadelphia, Louisville

REFINERS OF OKLAHOMA TEXAS AND LOUISIANA

PETROLEUM

REFINED OIL
GASOLINE
NAPHTHA
GAS OILS
PARAFFINE WAX
PETROLEUM COKE

Fuel Oil--Lubricating Oils

CYLINDER ENGINE
CORDAGE

RED AND PALE PARAFFINE OILS

New Stations Built or Being Built

Kansas City, Mo.—Standard Oil Co. of Indiana purchased property for filling station.

Charlotte, N. C.—William Shannonhouse is completing service station.

Mt. Ayr, Ia.—B. B. Poor is completing service station.

Davenport, Ia.—Roxana Petroleum Corp. will build filling station.

Cheboygan, Mich.—E. E. Bigger and C. D. Birdsall, formerly employed by Standard Oil Co. here, have formed partnership and will build service station.

Montrose, S. D.—Carr Bros. building two filling stations.

Galesville, Wis.—John Williamson and Henry French are completing service station.

Beach, N. D.—The Texas Co. will build service station.

Attleboro, Mass.—Dutee W. Flint and Thomas H. McCusker each seek permits for filling stations.

Baldwin, N. Y.—Howard D. Van DeWater will build filling station.

Alexandria, Ind.—Roxana Petroleum Corp. will build filling station.

Austin, Minn.—J. T. McCormick is building filling station.

Humboldt, Ia.—Business men here have organized oil company, and applied for charter. Company is expected to build filling station.

Toledo, O.—Empire Petroleum Co. has purchased site for filling station on Monroe St.

Tiffin, O.—Albert H. Diringer, proprietor of a service station here, will build another station.

Columbus, O.—Charles Milliken is building filling station.

Williamsport, O.—J. L. Hunsicker is completing filling station.

Huron, O.—Cities Service Oil & Gas Co. is completing filling station.

Tuscumbia, Mo.—J. A. Eads, proprietor of Eads' Garage at Iberia, will establish 10 filling stations in this territory, distributing Shell products.

Springfield, Mo.—Cowell Oil Co. is completing filling station.

Bethany, Mo.—William Bartlett is building filling station.

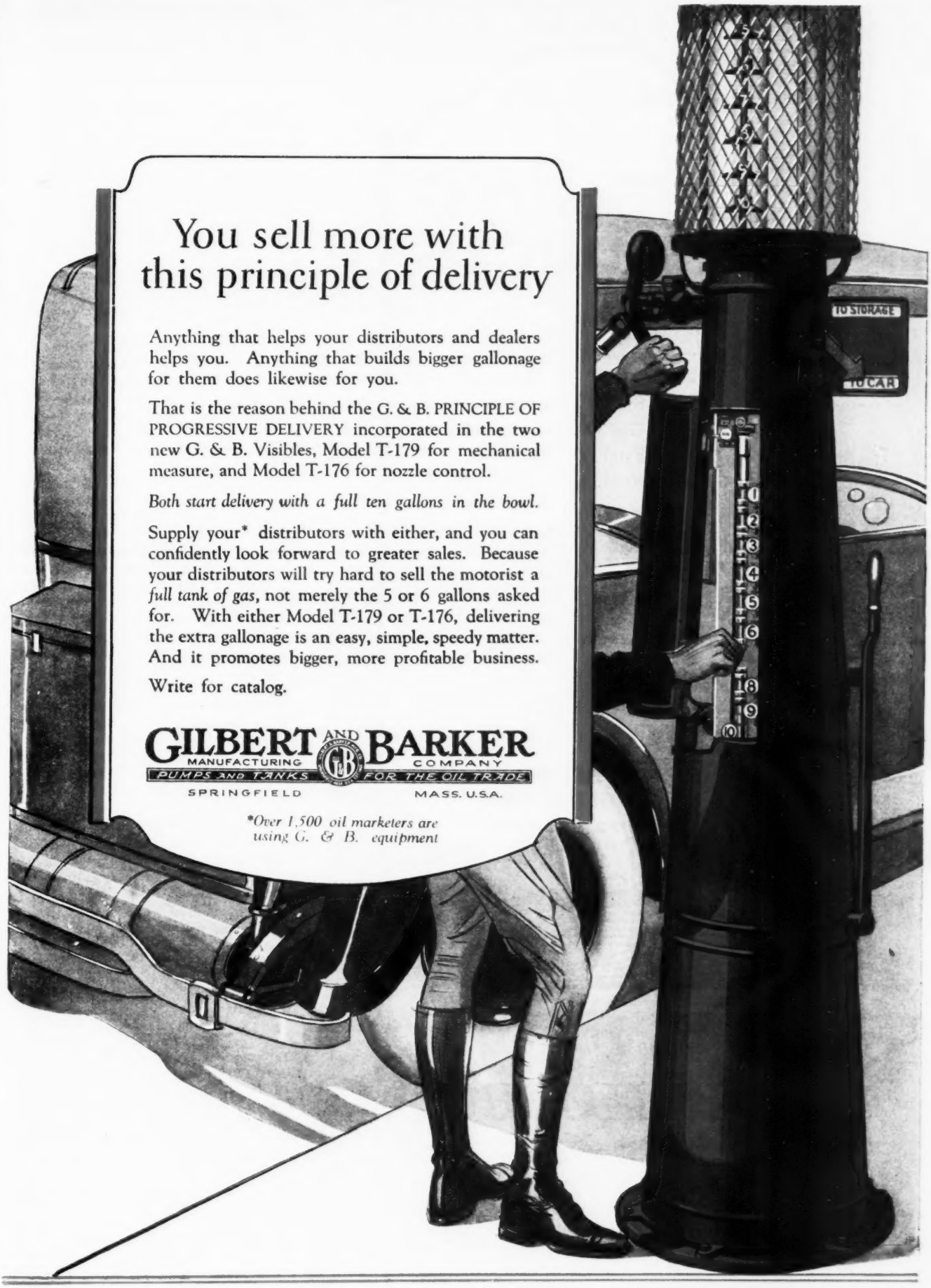
Jefferson City, Mo.—Skelly Oil Co. is completing filling station.

Bandera, Tex.—Lester Heinen will erect garage and filling station.

Port Arthur, Tex.—J. W. Roscoe will build filling station.

Hutchinson, Kan.—C. V. Havens will erect filling station.

LOS ANGELES, Oct. 20.—William Barr has resigned his position with Regan Forge & Engineering Co., San Pedro, Cal., to become assistant general manager of the Rotary Disc Bit Co., Los Angeles. He served Regan Forge as superintendent of manufacturing for five years and previous to that time was connected with Hughes Tool Co., having helped Howard Hughes "push around the lone wheelbarrow owned by the company" in the early days, as he puts it.



You sell more with this principle of delivery

Anything that helps your distributors and dealers helps you. Anything that builds bigger gallonage for them does likewise for you.

That is the reason behind the G. & B. PRINCIPLE OF PROGRESSIVE DELIVERY incorporated in the two new G. & B. Visibles, Model T-179 for mechanical measure, and Model T-176 for nozzle control.

Both start delivery with a full ten gallons in the bowl.

Supply your* distributors with either, and you can confidently look forward to greater sales. Because your distributors will try hard to sell the motorist a *full tank of gas*, not merely the 5 or 6 gallons asked for. With either Model T-179 or T-176, delivering the extra gallonage is an easy, simple, speedy matter. And it promotes bigger, more profitable business.

Write for catalog.

GILBERT AND BARKER
MANUFACTURING COMPANY
PUMPS AND TANKS FOR THE OIL TRADE
SPRINGFIELD MASS. U.S.A.

**Over 1,500 oil marketers are using G. & B. equipment*

• PUMPS THAT HELP YOU SELL •

M.W. KELLOGG CO.

Bubble Towers

7 DEY STREET - - - NEW YORK

LOS ANGELES, CAL., 329 PETROLEUM SECURITIES BLDG. KANSAS CITY, MO., 700 BALTIMORE AVE. SAN FRANCISCO, CAL., 444 MARKET ST.

Book Reviews

"Captains in Conflict" is a novel of business for business men, or rather for the individual business head and those looking forward to his position, who sometimes may feel harassed by the nature and extent of industrial competition. Its story of the overcoming of competition from the "trust," including arson, stealing patents, using spies, and so on, by the individual business by straight forward sales methods and management is quite likely to prove inspiring.

The story dates from 1900 and carries American business through the period of the springing up of consolidations to the reorganization after the war. The modern concept of the place of the consolidations is aptly set forth by a financier character in the novel:

"I'm from and of Wall Street, gentlemen, and I've seen them come and go for 25 years. I've helped finance some of the best of the trusts and, I regret to say, some that never should have been financed. But in all those years, I've never seen one combination go under that was formed for the honest purpose of utilizing the very real advantages of consolidation—economies in production, administration and distribution—for the purpose of reducing costs and passing on those reductions to the public, to the end of building up a substantial and permanent business.

"The failures have always been what we, around our office, speak of as 'greed failures.' Either the promotors have set out to make money by deliberately exploiting the widows and orphans, or else they have combined chiefly for the purpose of controlling prices and strangling competition."

The principal character in the book is a young man who inherits a stove business on the death of his father and his business struggle against a consolidation of other stove companies. The book is published by the A. W. Shaw Co.—V. B. G.

* * *

Ingersoll-Rand Co., 11 Broadway, New York, has put out a small but useful booklet entitled "Oil Well Blowing Handbook." The purpose of the book, as stated in the preface, is to correct some of the misunderstandings that have prevailed as to the operation of the gas lift and air lift. S. F. Shaw, an engineer who has been active in applying the gas lift to the wells of the Carter Oil Co. in the Seminole field, and a recognized authority on oil and gas lift, has compiled many valuable tables and examples of computing methods which are included in the book.

The work contains an article by

Mr. Shaw explaining the principles of the air and gas lift. An article by A. F. Hinton on "Tables for Figuring Tubing Submergence Save Time and Trouble", is reprinted from NATIONAL PETROLEUM NEWS in the handbook. Other articles in the book are "Solubility and Effects of Natural Gas and Air in Crude Oils", by D. B. Dow and L. P. Calkins of the Bureau of Mines, "Installation and Care of Compressors in the Oil Fields", and miscellaneous engineering tables of interest to the oil producer, furnished by Mr. Shaw and Ingersoll-Rand engineers.

The book is of handy pocket size, is bound in strong flexible covers and contains 128 pages of text with a number of ruled blank pages in the back for the making of notes.

* * *

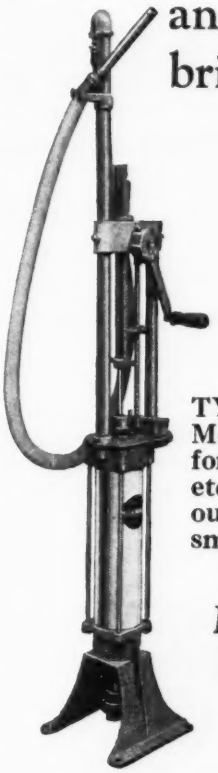
The "Natural Gas Handbook, 1927 Edition", is recently off the press. The book is published by the Metric Metal Works, Erie, Pa., and is the work of John C. Diehl, gas engineer of the company. This is the third edition of the book, its first appearance being in 1913. The second edition was exhausted early in 1925. The Natural Gas Handbook contains comprehensive and authoritative information on the various phases of the natural gas industry, designed for natural and manufactured gas executives, engineers and field men.

New features incorporated in the 1927 edition, according to the announcement of the publisher are: Popular description of production, transmission and distribution; description of the physical laws of gases, tables of maximum percentage of water vapor in gas; new description, illustrated, of the construction and operation of positive meters; article on large capacity meters; orifice meter coefficients; tables of deviation from Boyle's law; clauses for leases and contracts; capacities of fuel lines; capacities and control of wells, including 12 new tables; 28 new tables on pipe line capacities and illustrations of a number of capacity and pressure problems; testing compressors with high power prover; table of capacities of high and low pressure regulators; 30 new tables of combustion describing available contents of natural and manufactured gas; calorimetry as applied to natural gas. The price of the book is $5 in cloth, $6.50 in leather.

* * *

Die Gewinnung von Erdoel mit besonderer Berucksichtigung der bergmaennischen Gewinnung, (The Winning of Petroleum, with particular attention to the mining method) is recently off the press of the Verlag fon Julius Springer, Berlin, Germany. The book is by Gottfried Schneiders who during the war was at the head of the oil mining operations in Alsace. He describes chiefly the methods of recovering oil by mining as practiced in the Alsatian fields.

Inexpensive Outfits
for Lube Oil, Kerosene and Alcohol that bring Big Gallonage!



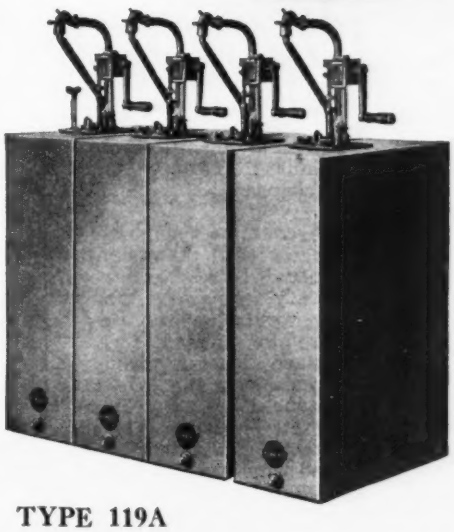
TYPE 13 One Gallon Pump, 60 or 120 Gal. Tank (cylindrical or square). Finely constructed, but surprisingly inexpensive.

TYPE 33F 1 Gal. Measuring Pump for Rural trade etc. A very fine outfit, for very small cost.

Don't Buy Until You Get Our Prices.

Remember, Brass cylinders and valves, rugged, slow-depreciation, fine finish and real value distinguish these outfits. Write today.

MILWAUKEE TANK WORKS
Milwaukee, Wisconsin
London New York
Established 1911



TYPE 119A
Compakt Lubes. Very High Grade, Low in Price. 25% heavier—means a lot in up-keep.

NATURAL GASOLINE
Grades A · AA · B · BB · C
CONTRACT OR SPOT
WILLOCK OIL CORPORATION
First National Bank Building · Phone Atlantic 3110
PITTSBURGH, PA.
52 Years Experience · It Counts

Oil Man's Bookshelf

A successful department head remarked the other day:

> "I find it necessary to keep up a constant program for *self improvement* in order to prevent my becoming obsolete so far as my value to my company is concerned."

And to the study of the best books on his work, he attributed a good share of his advancement.

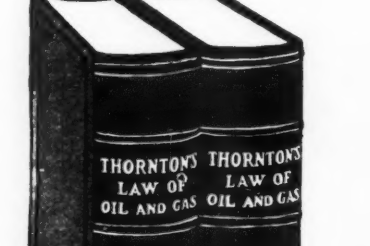
The OIL MAN'S BOOKSHELF will help you select books on oil that you can read with the greatest profit. If you do not find the subject you are interested in below, write us.

MID-CONTINENT OIL and GAS FORMS

The Mid-Continent Oil and Gas Form Book is written by oil lawyers who have had a wide range of experience representing major oil companies and operators in Oklahoma, Kansas, Texas, Louisiana and Arkansas.

The book contains complete sets of forms for each state having all the usual leases, assignment and royalty forms, etc., and many special forms not obtainable elsewhere in printed form such as surface leases, pickup station leases, seismograph leases, sale of unproduced oil, dry hole money contracts, bottom hole money contracts, contracts to shoot wells and control wild wells, etc. It includes forms not directly connected with the oil industry but frequently used such as curative title forms, quit claim deeds, liens, bills of sale, etc.

Producers and operators in the states of Oklahoma, Kansas, Texas, Louisiana and Arkansas will find the MID-CONTINENT OIL and GAS FORM BOOK a very valuable reference. Price $7.50.



The fourth edition of Thornton's Law of Oil and Gas, just out, gives the latest compilation of all statutes and court decisions pertaining to oil and natural gas.

All problems of transportation of oil and gas, explosions, leases, drilling contracts, insurance, taxes and personal injury cases are discussed thoroly and cases cited.

This law work is written by an authority—W. W. Thornton, late Judge of the Superior Court of Marion County, Ind.

Every oil company in the country should protect itself with the facts and information in Thornton's Law of Oil & Gas. Send for your copy today.

Two volumes, 3,000 pages—$20.

NATURAL GAS

By L. C. Lichty

Few books combine the calculations in measurement, compression and transmission of natural gas with practical operating data, as does NATURAL GAS by L. C. Lichty, University of Oklahoma.

Compression in single and double stages; effect of the constituents of natural gas on its deviation from gas laws; compressor characteristics, power curves and other graphs afford the practical man *quick use* of the data in this book.

Tests for gasoline content; design and layout of plants; pipe line construction and flows; storage capacities; machinery used in compression and transmission of natural gas—all described in detail.

523 pages—311 photographs

Price $7.50

—Cut and Mail—

National Petroleum News,
Room 706, 1213 West 3rd St., Cleveland, Ohio.

I want the books checked below. Enclosed is check or money order for $.....

- ☐ Mid-Continent Oil and Gas Forms $7.50
- ☐ Law of Oil and Gas $20.00
- ☐ Natural Gas $7.50

NAME .....

Address .....

.....

.....

ON THE LAZY BENCH

National Petroleum News

A lady went into a hardware store to buy a drinking dish for her dog.

"Would you like one with the words, 'For the Dog' printed on it?"

"Oh, no, thank you!" replied the customer, "You see, Fido can't read, and my husband never drinks water!"

—*Barnsdall*

* * *

She urged him to study the correspondence course at home, and he had—just like the advertisements say. At last his salary was raised fifty dollars a month, also like the advertisements say.

"Nell," he cried, "I owe it all to you!"

"Well, dear," she replied, "you won't after pay day."—*Skelly News.*

* * *

The man who once most wisely said, "Be sure you're right, then go ahead," well might have added this, to-wit—"Be sure you're wrong before you quit."—*Stanolind Record.*

* * *

Road Foreman (calling at house opposite): "Excuse me, madam, but have you been singing this morning?"

Lady of the House: "Yes, I have been singing a little, but why do you wish to know?"

Road Foreman (with obvious embarrassment): "Well, you see, my men have knocked off twice already, thinking it was the dinner whistle, so I thought I had better ask you not to hang out quite so long on that top note."—*Barnsdall.*

* * *

"Chief," asked a visitor in Fort Mink, "can you tellum where I buy some of those Indian beadwork?"

"I got mine from a mail-order house in Rochester, N Y."—*Stanolind Record.*

* * *

One of the marks of old age is failing memory. Maybe this explains why the older people get, the more they knock the younger generation.

—*Barnsdall*

* * *

A Scotchman was taking a friend over a new home he had built.

"But," exclaimed the visitor, "I notice that you've not pasted the paper on the walls, but nailed it up. What's that for?"

"Oh, aye," responded the Scotchman. "You see, we may not be living here always."—*Skelly News.*

* * *

"Eavesdropping again," said Adam, as his playmate fell out of the apple tree.—*Barnsdall.*

* * *

A co-ed went into a downtown bank to have a check cashed.

"But, miss," the paying teller advised her, "you'll have to get someone to introduce you before I can pay you the money on this check."

The co-ed stared at him disdainfully.

"Sir," she said haughtily, "I wish you to understand that I am here strictly on business. I am not making a social call. I do not care to know you."—*Skelly News.*

* * *

"Maude says her husband disgraced her on their honeymoon."

"How?"

"On the steamer she wanted the other passengers to think an ocean trip was an old story to them, but almost as soon as they went on board he pointed to a row of life-buoys and asked the captain what was the idea of all the extra tires."

—*Stanolind Record*

* * *

"My dear, your little boy looks old enough to be wearing long trousers."

"How dare you—that's my husband in his new golf clothes!"

—*Barnsdall*

* * *

Two small boys halted before a brass plate fixed on the front of a house whereon was inscribed in bold characters the word "Chiropodist."

"Chirrupodist!" remarked one of them, puzzled. "What's that?"

"Why," replied his companion, "a chirrupodist is a feller that teaches canaries to whistle."

—*Stanolind Record*

* * *

He had run out of gas on the outskirts of a New Hampshire town, saw a young boy coming along the road and carrying a big tin can.

"Say, boy," he yelled, "I hope that's gasoline you have in that can."

"Well I hope it ain't," returned the boy, with some heat. "It would taste terrible on ma's pancakes."

—*Skelly News*

* * *

Officer: "What's the big rush? Want me to pinch you?"

Sweet Young Speeder: "Oh, officer, just because you are a cop you don't need to get so familiar."—*Barnsdall.*

* * *

First Tramp (reading an old newspaper): "Here's a story about a cove who did no work for thirty years."

Second Tramp (wearily): "Oh, don't talk shop."—*Stanolind Record.*

* * *

Sign on a border restaurant near the Rio Grande in Texas: "Near Beer Sold Here and Real Beer Sold Near Here."—*Skelly News.*

Bottle Fold Type Folio

Your Name in Gold Free

Complete with Bottle Fold and Bottles *only* **$15.30**

364—A very complete and practical folio made from heavy 5-oz. black cowhide. 3¼-inch pocket that holds leather handled bottle fold. Contains sixteen 4-oz. plain bottles. One-inch pocket for stationery. Leather case containing six ½ oz. jars $3.25 additional.

Other styles in our FREE Catalog

L-U-C-E

Builders of Sales Luggage

614 Delaware Kansas City, Mo.

Two New Tanks

At Special Prices!

We have two new complete tank outfits for single pump installations at prices you cannot afford to ignore.

Outfit No. 120-C

120-gallon No. 12 ga. x 28" x 48" black underground with fittings listed below.

Outfit No. 1001-C

1000-gallon ¼" x 48" x 129" underground with fittings listed below.

All tanks electric arc welded. Write today—a direct order will save you time and money.

OTHER SPECIAL TANK OFFERS

Outfit No. 200-C

200-gallon No. 12 ga. x 28" x 72", black underground.

Outfit No. 280-C

280-gallon ¼" x 42" x 49" underground.

Outfit No. 5-C

5-bbl. No. 14 ga. x 36" x 63", galvanized.

Outfit No. 550-C

550-gallon ¼" x 48" x 73", underground.

Outfit No. 10-C

10-bbl. No. 14 ga. x 42" x 93", galvanized.

Outfit No. 1000-C

1000-gal. ¼" x 64" x 73", underground.

Each tank includes the following fittings: One 2" x 30" fill pipe with C I. Lock Cap; one 3½" x 1½" x 1½" or 3½" x 2" x 2" double bushing; one gauge stick.

All Prices f. o. b. Indianapolis

EMERSON-SCHEURING TANK COMPANY

Indianapolis Indiana

This SIGN will increase your gallonage

IT'S not only what this sign says that counts so much—*but what it means!*

As soon as you display this sign of the "Authorized Opaline Dealer", you sell motor oil by the commonsense method which gives motorists *correct lubrication* and maintains your PRESTIGE in SERVICE.

The Sinclair method of recommending the right grade of Opaline is a simple one—an exclusive one—and *it is correct!* It is based on the Sinclair Law of Lubrication. It provides Opaline in several grades to fit the degree of wear in a motorist's engine as indicated by the *mileage on the speedometer.*

Opaline and this method are worth knowing about—and thinking about. May we tell you about this successful method of selling *correct lubrication* with the full line of Opaline Motor Oils?

SINCLAIR REFINING COMPANY, INC.

Also Makers of Sinclair Gasoline and H-C Gasoline

45 NASSAU STREET, NEW YORK

Atlanta Boston Chicago Houston Kansas City

Entire contents copyrighted 1927 by Sinclair Refining Company, Inc.

Exporters Make Three Purchases In Mid-Continent Markets

Staff Special
TULSA, Oct. 22

MID-CONTINENT refinery market experienced only minor price changes during the week just closed. Two export purchases of high gravity gasolines in north Texas, and one of high gravity kerosene, and a somewhat better domestic demand for gasolines furnished the major interest.

The Sinclair Refining Co. about the middle of the week bought approximately half a million gallons of 64-66, 375 e.p. gasoline in north Texas at a price reported to be 6.375 cents a gallon. Late in the week the Carson Petroleum Co. was reported to have bought approximately half a million gallons of the same grade of gasoline at a price around 6.50 cents a gallon.

Earlier in the week the Sinclair Refining Co. also bought a sizeable quantity of 44 gravity kerosene from north Texas refiners at prices ranging from 5.25 to 5.50 cents a gallon. The goods were to move for export. The quantity purchased could not be learned. The Atlantic Refining Co. was reported to have bought a quantity of gas oil in Texas this week for export but the report was not confirmed.

The slightly better demand for gasolines has been attributed mainly to the uniformly favorable weather through most consuming territory the past week. Buying was reported in most quarters as rather slow the first of the week, and in some spots small quantities of distress goods were being offered on the market. The pick-up in demand was noticeable from about the middle of the week on to the close of business today.

It will be recalled that three or four weeks ago gasoline shipments were exceptionally good, and high gravity gasolines were scarce in Oklahoma. The demand for the U. S. Motor gasoline grades, however, then fell off considerably. Several refiners changed their runs to produce higher gravity products. There are several refiners in Oklahoma now who have larger quantities of high gravity goods to offer, and with demand off the past week or 10 days prices have barely held their own.

North Texas refiners have been making high gravities in preference to U. S. Motor grades. They have taken prices for export shipment considerably under the prices they accepted for domestic movement in small car lots. Domestic prices were well in line. Demand in north Texas for U. S. Motor grades has been sufficient to keep prices steady.

OKLAHOMA refiners' prices on 58-60 U. S. Motor were 6 cents and up this week to trade. Some goods have moved to marketers at 5.865 cents, with odd cars of distress goods as low as 5.75 cents. Marketers said today, however, that they had found it increasingly difficult to buy any goods of this grade at under 5.875 cents.

Arkansas and Louisiana refiners have been keeping their runs down for some time. They have been able to enjoy a considerably better market on gasolines than refiners in other areas. The Arkansas refiners especially are reported to be in good shape, with low crude charges and low stocks.

Natural gasolines have shown only minor price changes during the week. One manufacturer reported a sizeable sale of Grade BB in Texas this week at 5.75 cents, while several purchases of Grade AA both in Oklahoma and Texas for shipment to the east and to Gulf ports, have been reported. The Texas Co. sent a large inquiry into the field about the middle of the week. One company obtained a good part of the business on a contract arrangement for shipment over this month and next month. The contract arrangement was not announced.

SEVERAL manufacturers report they have their production completely sold up for the remainder of the month. The Sinclair Oil & Gas Co. reported this week that they had closed down two plants with a combined capacity of 1,800 gallons a day, and that The Texas Co. had closed down one plant of 600 gallons capacity.

Heavy buying on kerosenes the past 20 days has given that spot in the market its major support this week. The majority of refiners making the product are still shipping on the orders booked with exporters and large refiners for their own stations. The prevailing quotation on 41-43 water white treated kerosene was 4.75 cents, although one or two refiners were quoting 4.625 cents a gallon. The 42-44 w.w. grade was scarce at prices ranging from 5 to 5.25 cents.

A comparatively small amount of kerosene is being made in Louisiana and Arkansas. Prices were firm today at 4.75 to 5 cents a gallon.

Despite the heavy shipments of distillates reported by Mid-Continent refiners recently the price has shown no change for several weeks. The bulk of the movement at present was reported to be on contracts.

GAS oils also have shown no change in prices the past week. Inquiries for low cold test goods were more numerous.

Fuel oils continued to move comparatively well. Several refiners said this week their stocks of fuel oils were slightly more than they had hoped they would be at this time of the year, but that they were not worried. They expressed the opinion that with the coming of cooler weather an active market would be developed.

The Houston Oil Co. recently completed its fuel oil contract with the Cotton Belt railroad in Arkansas and has closed down its Camden, Ark. plant. The personnel of the company will be transferred to headquarters in Texas, according to reports, until conditions change sufficiently to warrant reopening of the plant.

No price changes were made this week in Oklahoma neutral oils and cylinder stocks. Refiners report movement has been holding up well, especially on the 200 No. 3 and 5 color oils, and on the Bright Stock.

Majority of refiners report they are well sold up on wax at present. Sales this week ranged from 2.75 to 3.125 cents a pound for the 124-126 white crude scale goods. The Pierce Petroleum Co., having a large candle trade in Mexico, now is completely out of the wax market picture in Oklahoma.

GRAVER

will be at

West Baden, Indiana

AMERICAN OIL MEN'S ASSOCIATION

November 2--3--4

Booth 70

A new idea in bulk storage & filling station equipment and merchandising

Call at our booth and talk over this new idea with us. It is something which we have developed for you which will, we believe, make easier selling possible. Stop at our booth and let us explain it to you

GRAVER Corporation Founded 1857

EAST CHICAGO, INDIANA

Grand Central Terminal
NEW YORK

Atlas Life Bldg.
TULSA

West Bldg.
HOUSTON

America Fore Bldg.
CHICAGO

Capitol National Bank
LANSING, MICH.

Box 1008
CEDAR RAPIDS, IA.

Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Oct. 24	Prices Oct. 17	Prices Oct. 10
52-54 Naphtha	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
54-56 Naphtha	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
58-60 Gasoline	8.00 – 8.375	8.00 – 8.375	8.25 – 8.50
60-62 Str.-run gasoline	8.75 – 9.00	8.75 – 9.00	8.75 – 9.25
64-66 Str.-run gasoline	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
68-70 Str.-run gas. 350-360 e.p.	10.00 –10.25	9.75 –10.25	9.75 –10.25
OKLAHOMA			
48-50 450 e.p. naphtha	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
50-52 450 e.p. naphtha	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
56-58 450 e.p. gasoline	6.00	6.00	6.00
58-60 450 e.p. gasoline	6.00	6.00	6.00 – 6.125
56-58 U. S. Motor, 437 e.p.	**6.00 – 6.125	**6.00 – 6.125	**6.00 – 6.125
58-60 U. S. Motor, 437 e.p.	6.00 – 6.25	6.00 – 6.25	6.00 – 6.50
60-62 437 e.p. gasoline	**6.25 – 6.50	**6.25 – 6.75	**6.25 – 6.75
60-62 400 e.p. gasoline	**6.50 – 6.75	**6.50 – 7.00	**6.50 – 7.00
64-66 390 e.p. gasoline	**6.875	**6.875– 7.00	**6.875– 7.00
64-66 375 e.p. gasoline	**7.00 – 7.25	**7.00 – 7.25	**7.00 – 7.25
68-70 350-360 e.p. gasoline	7.125– 7.375	7.50	*7.50
KANSAS (F. O. B. refinery Kansas destination)			
58-60 U. S. Motor 437 e.p.	6.50	6.50	6.50
60-62 400 e.p. gasoline	7.00 – 7.125	7.00	7.00
64-66 375 e.p. gasoline	7.50	7.375– 7.50	7.375– 7.50
NORTH TEXAS			
48-52 450 e.p. naphtha	†6.00	†6.00	†6.00
56-58 450 e.p. gasoline	5.875	5.875	5.875
58-60 450 e.p. gasoline	5.875– 6.125	5.875– 6.125	5.875– 6.125
58-60 U. S. Motor 437 e.p.	6.00 – 6.125	6.00 – 6.125	6.125– 6.25
60-62 400 e.p. gasoline	6.375	6.375	6.50 – 6.625
64-66 390 e.p. gasoline	6.50	6.50	6.75 – 6.875
64-66 375 e.p. gasoline	6.625– 6.875	6.75 – 7.00	7.00
68-70 350-360 e.p. gasoline	7.00 – 7.25	7.00 – 7.25	7.25 – 7.375
NORTH LOUISIANA (For Louisiana and differential territory destination)			
58-60 U. S. Motor gasoline	6.50 – 6.625	6.50 – 6.625	6.50 – 6.625
ARKANSAS (For Arkansas intrastate shipment)			
56-58 450 e.p. gasoline	6.25	6.25	6.25
58-60 450 e.p. gasoline	6.25	6.25	6.25
58-60 U. S. Motor 437 e.p.	6.75	6.625– 6.75	6.625
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
58-60 U. S. Motor 437 e.p.	**6.375– 6.625	**6.375– 6.625	**6.375– 6.625
CALIFORNIA			
*54-58 U.S. Motor 437 e.p.	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
*58-60 U.S. Motor 437 e.p.	8.00 – 9.00	8.00 – 9.00	8.00 – 9.00
*42-45 Eng. dis. 445-480 e.p.	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00

*2c tax to be added if used in state.

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F. Since Oct. 1, 1927 all naturals must pass corrosion test.)

OKLAHOMA			
Grade AA, 80-87.9, 90% Recovery	6.00	6.00 – 6.125	6.125– 6.25
Grade A, 72-79.9, 90% Recovery	6.00	6.00 – 6.125	6.125– 6.25
Grade BB, 84-92, 85% Recovery	5.75	5.75	5.75
Grade B, 76-83.9, 85% Recovery	5.75	5.75	5.75
Grade C, 80-90, 78% Recovery	5.625	5.50 – 5.625	5.50 – 5.625
NORTH TEXAS (F. O. B. Breckenridge)			
Grade AA, 80-87.9, 90% Recovery	6.00 – 6.125	6.125– 6.25	6.125– 6.25
Grade A, 72-79.9, 90% Recovery	6.00 – 6.125	6.125– 6.25	6.125– 6.25
Grade BB, 84-92, 85% Recovery	5.75	5.75	5.75
Grade B, 76-83.9, 85% Recovery	5.75	5.75	5.75
Grade C, 80-90, 78% Recovery	5.625	5.625	5.625
NORTH LOUISIANA (F. O. B. Monroe District)			
Grade AA	†6.375– 6.50	†6.375– 6.50	†6.375– 6.50
Grade BB	†6.125	†6.00 – 6.125	†6.00 – 6.125
Grade C	†6.125	†6.00 – 6.125	†6.00 – 6.125
CALIFORNIA			
75-85, 375-390 e.p. blend	9.50 –10.00	8.50 –10.00	8.00 –10.00

MOTOR FUEL BLENDS

PENNSYLVANIA			
68-70 Blend 437 e.p.	Prices	.....	.....
64-66 Blend 437 e.p.	temporarily	.....	.....
60-62 Blend 437 e.p.	discontinued	.....	.....
OKLAHOMA			
64-66 Blend 437 e.p.	6.00 – 6.125	6.00 – 6.125	6.00 – 6.125

BURNING OILS

PENNSYLVANIA			
45 w.w. kerosene	6.75 – 7.00	6.75 – 7.00	6.875– 7.125
46 w.w. kerosene	7.25 – 7.50	7.25 – 7.50	7.00 – 7.25
47 w.w. kerosene	7.25 – 7.75	7.25 – 7.50	7.25 – 7.50
OKLAHOMA			
41-43 w.w. kerosene	4.625– 4.75	4.625– 4.75	4.50
42-44 w.w. kerosene	5.00 – 5.25	4.75 – 5.00	*4.75 – 5.00
KANSAS (F. O. B. refinery Kansas destination)			
41-43 w.w. kerosene	4.875– 5.25	4.875– 5.25	4.875– 5.25
42-44 w.w. kerosene	5.625– 5.75	5.625– 5.75	5.625– 5.75
NORTH TEXAS			
40-42 w.w. kerosene	†4.375– 4.50	†4.375	†4.25 – 4.375
41-43 w.w. kerosene	†4.625– 4.75	†4.625– 4.75	†4.50 – 4.625
NORTH LOUISIANA (For Louisiana and differential territory destination)			
41-43 w.w. kerosene	5.00	4.75 – 4.875	4.75
ARKANSAS (For intrastate shipment only)			
42-44 kerosene	5.00	4.75 – 5.00	4.75 – 5.00
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
42-44 kerosene	4.75 – 5.00	4.75	4.75
CALIFORNIA			
38-40 w.w. kerosene	5.00 – 5.50	5.00 – 6.00	5.00 – 5.50

NEUTRAL OIL

PENNSYLVANIA Vis.	Prices Oct. 24	Prices Oct. 17	Prices Oct. 10
	(Viscosity at 70°F.)		
200 No. 3 Assoc. Filt.	34.00 –34.50	34.00 –34.50	34.00 –34.50
180 No. 3 Assoc. Filt.	32.00 –32.50	32.00 –32.50	32.00 –32.50
150 No. 3 Assoc. Filt.	27.00 –28.00	27.50 –28.00	27.50 –28.00
	(Non Viscous)		
34 Grav. 330-340 Flash	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
36 Min. Neut. 300-305 Flash	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
**OKLAHOMA Vis. Color	(Viscosity at 100°F.)		
100—No. 2	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
150—No. 3	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
150—No. 4	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
180—No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
180—No. 4	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
180—No. 5	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
200—No. 3	9.50 –11.00	9.50 –11.00	9.50 –11.00
200—No. 4	9.50 –10.75	9.50 –10.75	9.50 –10.75
200—No. 5	8.50 –10.50	8.50 –10.50	8.50 –10.50
220—No. 3	12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4	12.25 –12.50	12.25 –12.50	12.25 –12.50
220—No. 5	11.50 –12.00	11.50 –12.00	11.50 –12.00
240—No. 3	14.00	14.00	14.00
240—No. 4	13.50	13.50	13.50
240—No. 5	12.00 –13.00	12.00 –13.00	12.00 –13.00
280—No. 3	16.00 –17.00	16.00 –17.00	16.00 –17.00
280—No. 4	15.25	15.25	15.25
280—No. 5	14.00 –15.00	14.00 –15.00	14.00 –15.00
300—No. 5-6	17.00	17.00	17.00
**GULF COASTAL Vis. Color	(Viscosity at 100° F., pour test 0)		
100—No. 2 Unfilt. Pale	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
200—No. 3 Unfilt. Pale	9.50 –10.00	9.50 –10.00	9.50 –10.00
300—No. 3 Unfilt. Pale	10.00 –11.00	10.00 –11.00	10.00 –11.00
500—No. 3½ Unfilt. Pale	12.00 –12.50	12.00 –12.50	12.00 –12.50
750—No. 4 Unfilt. Pale	14.50 –15.00	14.50 –15.00	14.50 –15.00
200—No. 5½ Red Oil	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300—No. 5½ Red Oil	9.50 –10.00	9.50 –10.00	9.50 –10.00
500—No. 6 Red Oil	10.50 –11.00	10.50 –11.00	10.50 –11.00
750—No. 6 Red Oil	13.00 –13.50	13.00 –13.50	13.00 –13.50
**CALIFORNIA Vis. Color	(Viscosity at 100°F.)		
100—No. 2	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
100—No. 3	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
200—No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
300—No. 3	10.50 –11.00	10.50 –11.00	10.50 –11.00
450—No. 3-3½	13.00 –13.50	13.00 –13.50	13.00 –13.50
550—No. 3-3½	14.50 –15.00	14.50 –15.00	14.50 –15.00
600—No. 3-3½	15.00 –15.50	15.00 –15.50	15.00 –15.50
100—No. 5	6.50	6.50	6.50
200—No. 5	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300—No. 5	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
400—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
500—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
600—No. 5	12.00 –12.50	12.00 –12.50	12.00 –12.50
700—No. 7	14.00 –14.50	14.00 –14.50	14.00 –14.50

CYLINDER STOCKS

OKLAHOMA			
190-200 Vis. at 210° Brt. St.	31.00 –32.00	31.00 –32.00	31.00 –32.00
150-160 Vis. at 210° Brt. St.	25.00 –27.00	25.00 –27.00	25.00 –27.00
600 E St. 140-150 Vis.-210°	17.00 –18.00	17.00 –18.00	17.00 –18.00
600 St. Ref. Olive Green	9.00 –10.00	9.00 –10.00	9.00 –10.00
600 St. Ref. Dark Green	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
Black Oil	5.00	5.00	5.00
PENNSYLVANIA	(1-inch Immersion Test)		
600 Steam Refined	10.00 –10.50	10.00 –10.50	10.00 –10.50
650 Steam Refined	11.75 –12.50	12.00 –12.50	12.00 –12.50
600 Flash	16.50 –17.50	16.50 –17.50	16.50 –17.50
625 Flash	27.00 –28.00	27.00 –28.00	27.00 –28.00
600 Warren E	18.50 –19.50	18.50 –19.50	18.50 –19.50
600 Oil City E	16.50 –17.00	17.00	17.00
600 D Filtered	25.50 –26.00	25.50 –26.00	25.50 –26.00
Cold Test Stocks (brt. filt.)	33.00 –33.50	33.50 –34.00	34.00 –34.50
Cold Test Stock (dark filt.)	31.00 –31.50	31.50 –32.00	31.50 –32.00

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher)

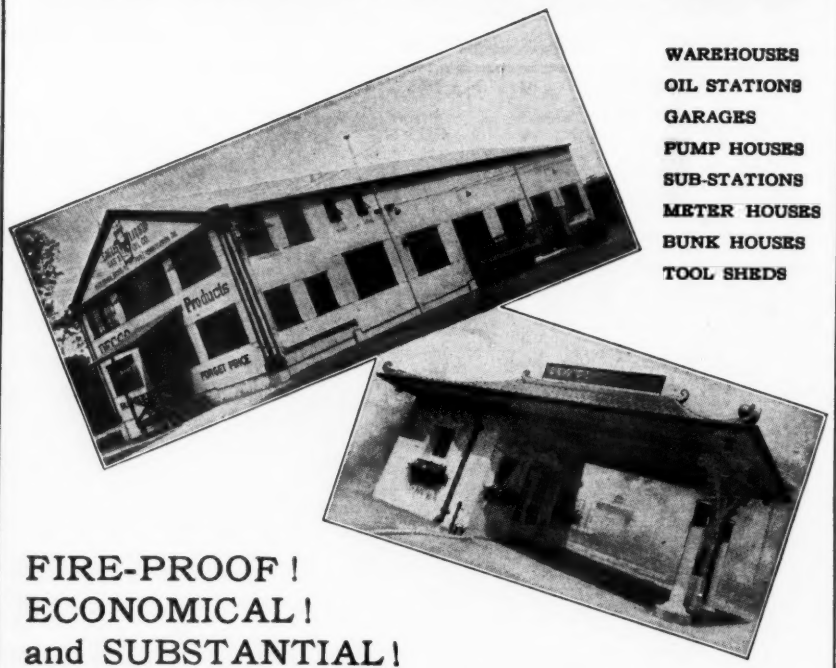
†PRICES NOMINAL ††ONLY ONE REFINER QUOTING *QUOTATIONS ONLY **REPRESENTS BOTH SALES AND QUOTATIONS

The
NATIONAL
REFINING
COMPANY
PETROLEUM PRODUCTS

THREE MODERN REFINERIES:
Marietta, Ohio Refinery
operated on Pennsylvania Crude
Findlay, Ohio Refinery
operated on Ohio Crude
Coffeyville, Kansas Refinery
operated on Midcontinent Crude

National Headquarters
NATIONAL BLDG., CLEVELAND, O.

STEEL BUILDINGS for EVERY PURPOSE



WAREHOUSES
OIL STATIONS
GARAGES
PUMP HOUSES
SUB-STATIONS
METER HOUSES
BUNK HOUSES
TOOL SHEDS

FIRE-PROOF!
ECONOMICAL!
and SUBSTANTIAL!

Send for our complete catalog of "STEEL BUILDINGS"

THE EDWARDS MANUFACTURING CO.
524-544 Eggleston Ave. Cincinnati, Ohio

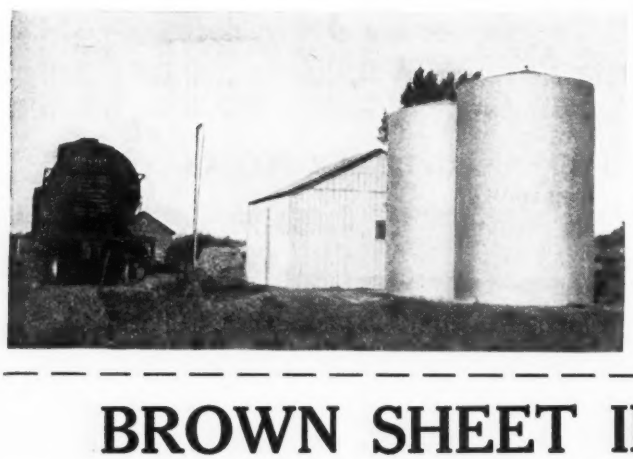
Order Those Tanks NOW!

Why Wait Until the Oil Rush Passes You By?

Tanks On Hand Ready For Immediate Shipment

The original double (two operation) Butt Welded Type Storage Tanks,
One piece bottoms or ends, thickness of material guaranteed.

TRUCK TANKS, BARRELS, PUMPS, FITTINGS, COMPLETE EQUIPMENT



Mail This Coupon. TODAY

Send prices and specifications on the following:

..... Tanks

..... Fittings

..... Other Equipment

Name .....

Address .....

BROWN SHEET IRON & STEEL CO.

978 Berry Avenue - - - ST. PAUL, MINN.

Refinery Markets on Wax and Heavy Oil Products

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

WAX

PENNSYLVANIA	Prices Oct. 24	Prices Oct. 17	Prices Oct. 10
Per Pound, New York			
122-124 white crude scale	3.125– 3.25	3.25	3.25
124-126 white crude scale	3.25	3.25	3.25
OKLAHOMA			
**124-126 Semi-refined..	2.75 – 3.125	2.625– 3.125	2.875– 3.125
CALIFORNIA			
White crude scale, per pound, ton lots.....	6.00 – 6.50	6.00 – 7.00	6.00 – 7.00

FUEL OIL

PENNSYLVANIA			
36-40 fuel oil.....	4.50 – 4.75	4.75	4.75
30-34 fuel oil.....	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625
28-32 fuel oil.....	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625
OKLAHOMA			
38-40 straw distillate.....	3.25	3.25	3.25
36-38 straw distillate.....	3.00	3.00	3.00
*32-36 gas oil, straw.....	†2.625	†2.625	2.50 – 2.625
*32-36 dark gas oil.....	2.50 – 2.625	2.50 – 2.625	2.50 – 2.625
28-30 fuel oil (in bbls.)...	$0.95 – 1.00	$0.95 – 1.00	$0.95 – 1.00
26-28 fuel oil (in bbls.)...	$0.90 – 0.95	$0.90 – 0.95	$0.90 – 0.95
24-26 fuel oil (in bbls.)...	**$0.875– 0.90	**$0.875–0.90	**$0.875–0.90
22-26 fuel oil (in bbls.)...	**$0.85	**$0.85	**$0.85
18-22 fuel oil (in bbls.)...	**$0.75– 0.80	**$0.75– 0.80	**$0.75– 0.80
16-18 fuel oil (in bbls.)...	**$0.75	**$0.75	**$0.75
14-16 fuel oil (in bbls.)...	**$0.75	**$0.75	**$0.75

*Zero cold test low flash goods sell for ⅛ to ¼ cent more per gallon.

KANSAS (F. O. B. refinery Kansas destination.)			
38-40 straw distillate.....	3.75	3.50 – 3.75	3.50 – 3.75
36-38 straw distillate.....	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
32-36 gas oil.....	2.75 – 3.00	2.75 – 2.875	2.75 – 2.875
24-26 fuel oil	*$0.95– 1.05	*$0.95 – 1.05	*$0.95 – 1.05
18-22 fuel oil.....	*$0.85– 0.90	*$0.85 – 0.90	*$0.85 – 0.90
NORTH TEXAS			
38-40 straw distillate.....	3.125	3.125– 3.25	3.125– 3.25
32-36 gas oil, cracked....	2.50	2.625	2.625
32-36 gas oil, uncracked..	2.50 – 2.625	2.625	2.625
24-26 fuel oil (in bbls.)...	$0.85 – 0.875	$0.85 – 0.90	$0.875– 0.90

GULF COASTAL	Prices Oct. 24	Prices Oct. 17	Prices Oct. 10
Fuel (in bbls.).....	$1.60 –$1.65	$1.60 –$1.65	$1.60 –$1.65
Gas oil.....	4.25 – 4.50	4.25 – 4.50	4.25 – 4.50
NORTH LOUISIANA (For Louisiana and differential territory destination)			
32-36 gas oil, dark.....	3.00 – 3.25	3.00 – 3.25	3.00 – 3.25
32-36 gas oil, straw.....	3.00 – 3.25	3.00 – 3.25	3.00 – 3.25
16-20 fuel oil (in bbls.) ...	$1.05 – 1.10	$1.075– 1.125	$1.075– 1.125
ARKANSAS (For Arkansas intrastate shipment only)			
32-36 gas oil.....	3.00 – 3.25	3.00 – 3.25	3.25 – 3.375
28-32 gas oil.....	2.875– 3.00	3.00	3.00 – 3.25
Road oil.....	$1.25 – 1.30	$1.25 – 1.30	$1.25 – 1.30
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
28-32 gas oil.....	2.75 – 2.875	2.75 – 3.00	2.75 – 3.00
Smackover crude fuel....	$1.10 – 1.15	$1.10 – 1.15	$1.10 – 1.15
Road oil.....	$1.15 – 1.25	$1.15 – 1.25	$1.15 – 1.25
CALIFORNIA (F. O. B. San Joaquin Valley. At San Francisco, 4c per bbl. more)			
14-18 fuel oil (in bbls.)...	$0.65 –$0.90	$0.65 –$0.90	$0.65 –$0.90
14-18 Bunker oil (in bbls.)	$0.85 –$1.00	$0.85 –$1.00	$0.85 –$1.00
30-34 gas oil (in bbls.)...	$0.90 –$1.00	$0.90 –$1.00	$0.90 –$1.00
27 Plus Diesel oil (in bbls.)	$0.85 –$1.00	$0.85 –$1.00	$0.85 –$1.00

PETROLATUMS

PENNSYLVANIA (In cents per pound in tank cars; in barrels, in car lots ¾c per pound more.)			
Snow White.....	9.25	9.25	9.25
Lily White.....	8.25	8.25	8.25
Cream White.....	7.25	7.25	7.25
Light Amber.....	5.50	5.50	5.50
Amber.....	4.50	4.50	4.50
Red.....	3.75	3.75	3.75
Green No. 5 color.....	3.50	3.50	3.50

**PETROLEUM COKE

(Per ton in car lots)

Lump.....	$5	$5	$5
Still run.....	$3	$3	$3
Breeze.....	$2	$2	$2

†PRICES NOMINAL ††ONLY ONE REFINER QUOTING *QUOTATIONS ONLY **REPRESENTS BOTH SALES AND QUOTATIONS

Is a Drum a Measure or Just a Container?

Staff Special

CHICAGO, Oct. 22.—A recently-instituted city tax on oil drums used at filling stations and garages in Chicago has brought a protest from the Chicago Oil Men's club to the city sealer. Oil drums are taxed $1 each per inspection and are inspected twice a year in Chicago, which runs into an elaborate expenditure.

The "drum tax" is in addition to inspection fees charged by the city sealer on gasoline pumps, motor oil measuring pumps, quart and gallon measures and even quart fruit jars used for exhibiting motor oil and dispensing it. The oil men are trying to convince the city officials that an ordinary steel drum is not a measuring device at all but a mere container for purposes of easy storage and conveyance. It is said that the city is anxious to view them as measures at $1 apiece.

The committee from the Chicago Oil Men's club active in the matter consists of Charles S. Rosenthal, Apex Motor Fuel Co.; George C. Peterson, Geo. C. Peterson Co.; and R. T. Seidel of Agni Motor Fuel Co. All of these men are Independent jobbers with extensive gallonage in metropolitan Chicago.

Propose Oil Office Building

LOS ANGELES, Oct. 21.—The oil men of California want an office building all their own in Los Angeles, and plans for such a building were discussed at the monthly luncheon served in Los Angeles Tuesday at noon, under the auspices of the Chamber of Mines and Oil of California.

A picture of the proposed 13 story, fire proof and up-to-the-minute building was thrown upon the screen, and Joseph Scott, well known attorney, and co-receiver of the Julian Petroleum Corp., gave many reasons while the oil fraternity should take space in the building.

Eastern Kentucky Refining Market

ASHLAND, Oct. 24.—Kerosene is in very good demand in eastern Kentucky refining district, and gasoline is moving satisfactorily. Fuel oil is slow. Prices on Oct. 24 were, f.o.b. refinery:

60-62, 400-425 e.p. gasoline	9.25
64-66, 375-390 e.p. gasoline	9.50
68-70, 350-360 e.p. gasoline	10.00
41-43 w.w. kerosene	7.00
34-36 gas oil	4.75
24-26 fuel oil	3.25

Shippers Must Furnish Placards After Nov. 1.

Staff Special

TULSA, Oct. 24.—Effective Nov. 1, shippers of gasoline must provide inflammable placards for all tank cars they bill out, as well as "dangerous-empty" placards for return billings, according to new regulations adopted by the Interstate Commerce Commission. Railroads have been relieved of the expense of providing shippers with the placards.

The "inflammable" placard is a diamond 10¾ inches square with the word "inflammable" printed in red letters 2½ inches high. The "dangerous" placard is of the same size. The right half of the card is solid black and the left side white with black letters. Placard holders must not cover more than ⅜ inch of the cards on any side. Present supplies of placards may be used up until a further order is issued.

Refiners desiring samples so that they may have their own cards printed may obtain them from the Bureau of Explosives. The Bureau will sell any quantity to shippers not wishing to have their own cards prepared.

High Test Demand Exceeds Motor; Prices Generally Steady

Staff Special
CHICAGO, Oct. 22

MOST 58-60 U. S. Motor gasoline through Chicago resale market this week continued to sell at 6 to 6.125 cents. Several sellers were asking 6.25 cents and reported fair business. Practically all offices in the Chicago oil community reported a stiffening in prices in Oklahoma. Demand was not heavy at any time during the week but a fairly steady call for small lots of material was reported generally.

The demand for higher gravity gasolines was reported fair with prices continuing firm and generally unchanged over latter part of last week. Most quarters reported better demand for high test than for U. S. Motor gasoline. The 60-62, 437 e.p. gasoline sold throughout the week at 6.25 to 6.375 cents, with some material moving at 6.125 cents. The 60-62, 400 e.p. gasoline was in the best demand of the higher gravities, several sellers reported. Most sellers were getting 6.625 to 6.75 cents while some sales were made at 6.50 cents. The 64-66, 375 e.p. gasoline moved throughout the week at 7 to 7.25 cents.

Kerosene continued to be the strongest spot in the Chicago market. Domestic demand was reported rather light in most quarters, although some sellers reported good business. Comparative scarcity of this product was credited by most quarters with keeping prices steady. The 41-43 w.w. kerosene opened the week at 4.625 cents flat and moved up to 4.625 to 4.75 cents on Wednesday and continued to sell through remainder of the week at this price. Some material also moved at 4.50 cents during the week.

Demand for distillates was quiet, 38-40 straw continued to sell at 3.25 to 3.375 cents. Some material was reported as being moved at 3.125 cents.

Gas oil demand was reported as being fairly good. While some ordinary 32-36 dark gas oil was sold at 2.50 cents during the week the majority of this goods moved at 2.625 cents. The dark gas oil with a zero cold test was in better demand than ordinary goods. Most sellers continued to ask 2.75 cents with some getting 2.875 cents. The 32-36 straw zero gas oil remained unchanged at 3 to 3.125 cents.

Situation on fuel oil was virtually unchanged. The 28-30 fuel oil sold at $1.00 to $1.05, with some quotations as high as $1.10 for zero cold test material. The 24-26 fuel was at $0.85 to $0.875, while 22-26 was moving at $0.85 flat in most sales. A wide range of prices was reported on the 18-22 fuel oil. While most of the trade were asking $0.80 to $0.825 for this goods, some sellers reported moving material as low as $0.75 to meet competition. Quotations on Smackover crude fuel remained unchanged at $1.025 to $1.075.

Temperatures will be above normal most of next week in S. O. Indiana territory with probably one or two precipitation periods during the week.

LOS ANGELES, Oct. 21.—Stephens H. Brooks, president of the Brooks Engineering Co., recently returned to Los Angeles from New York after closing an order for about $132,000 worth of steel tank equipment, sold through the Amtorg Trading Corp. to the Grozeneft government oil fields in United Sovereign Soviet Republic (Russia). The equipment will be used in the Baku fields. This is said to be largest foreign order for equipment of this kind ever placed in the United States. The vent portion of the order was shipped this week and the order will be completely filled not later than Jan. 1.

PLATT'S
OILGRAM
Petroleum Markets-Every Day

It's A Necessity

THIS oil jobber from Illinois proved to himself that the OILGRAM was a necessity to his business.

Read his letter:

"We have tried taking the OILGRAM quarterly and then allowed our subscription to expire, but we are now thoroughly convinced that *it is a necessity with every jobber the whole year 'round.*
"Enclosed is check to cover one year's subscription."

PLATT'S OILGRAM is one of your biggest aids to showing a profit at the end of the year. The information in one single issue has saved subscribers many times its yearly cost.

Try this daily market service for 3 months and see how it fits into your business. 3 months for $25, or $75 for a whole year.

Send your order to the nearest mailing point.

TULSA—904 World Bldg.
CHICAGO—35 E. Wacker Drive
NEW YORK—342 Madison Ave.
CLEVELAND—712 Penton Bldg.

Week's Price Changes Tank Wagon Markets

Gasoline Changes

Magnolia Petroleum—Correction: Gasoline prices at San Antonio were in error in tank wagon table of Oct. 19 issue. The 1 cent cut on Sept. 24 had already been published in the Oct. 12 issue, which brought t.w. price to 13 cents, s.s. price to 15 cents, including 3 cent state tax. These prices were in effect on Oct. 17.

T.w. and s.s. prices gasoline reduced 1 cent, Tulsa, to 14 cents and 15 cents respectively, including 3 cent state tax, Oct. 20.

* * *

Continental Oil—T.w. and s.s. prices gasoline reduced 1 cent, Pueblo, both to 15 cents, including 3 cent state tax, **Oct. 18.**

Standard of California—Correction: Arizona gasoline tax was increased 1 cent, Aug. 1, to 4 cents. Prices were raised 1 cent on that date to 23 cents t.w., and 27 cents s.s., including tax, at Phoenix. Prices are corrected in this week's issue.

Correction

Due to typographical error, price of Pennsylvania 58-60 gasoline in Oct. 17 column of prices in the refinery market tables on page 115 of the Oct. 19 issue was published as 8.00 to 8.25 cents. Price on Oct. 17 should have been 8.00 to 8.375 cents. It has been corrected in the proper column in the table of this week's issue.

Manhattan Oil Co. Buys Penn Lubric

TULSA, Oct. 22.—The Manhattan Oil Co. has purchased the Penn Lubric Oil Co. of Kansas City, it was announced Oct. 18. The properties include about 65 bulk and service stations in Missouri and Kansas, which are said to have brought the sellers about $500,000.

The Penn Lubric company recently consolidated its properties with the station system of the Diamond Refining Co. of Kansas City.

With the addition of this chain of stations the Manhattan now has 415 bulk and service stations extending from Kansas City to the Canadian border. Since its purchase in July 1926, of properties of the Monark Gasoline and Oil Co. of Kansas City the company has been one of the most important distributors in that area. The new purchase will give the company an even greater outlet locally for the products of its Kansas City, Kan., refinery.

CHAPPELL, Neb.—A second service station has just been opened here by A. R. Dodd, who is handling Sinclair products.

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

(OIL PRICE HANDBOOK has t.w. and s.s. markets for whole year arranged for quick reference)

These Prices In Effect October 24, 1927

S.O. NEW JERSEY TERRITORY

	Gasoline T.W.	Gasoline Tax	Gasoline Total T.W.	Gasoline S.S.	Oil T.W.
Atlantic City, N. J.	16	2	18	20	14
Newark, N. J.	16	2	18	20	14
Annapolis, Md.	16	4	20	23	12
Baltimore, Md.	16	4	20	23	10
Cumberland, Md.	16	4	20	23	14
Washington, D. C.	16	2	18	21	12
Danville, Va.	16	4½	20.5	*	14
Norfolk, Va.	16	4½	20.5	23.5	12
Richmond, Va.	14	4½	18.5	21.5	14
Roanoke, Va.	16	4½	20.5	23.5	14
Petersburg, Va.	16	4½	20.5	23.5	14
Charleston, W. Va.	16	4	20	23	14
Keyser, W. Va.	16	4	20	*	14
Parkersburg, W. Va.	13	4	17	20	14
Wheeling, W. Va.	16	4	20	23	14
Charlotte, N. C.	16	4	20	23	14
Hickory, N. C.	16	4	20	23	14
Mt. Airy, N. C.	16	4	20	23	14
Salisbury, N. C.	16	4	20	23	14
Charleston, S. C.	15	5	20	23	14
Columbia, S. C.	15	5	20	23	14

*Dealers set own prices. S. O. New Jersey does not operate station.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

*New York City	17	0	17	21	15
Albany, N. Y.	17	0	17	19	15
Buffalo, N. Y.	15	0	15	18	14
†Rochester, N. Y.	13	0	13	16	13
Syracuse, N. Y.	17	0	17	19	15
Boston, Mass.	17	0	17	18	15
Augusta, Me.	17	3	20	22	15
Manchester, N. H.	17	3	20	22	15
Burlington, Vt.	17	3	20	22	15

*In steel barrels.
†It is reported that S. O. New York is selling a second grade of gasoline at Rochester, 4c below the above posted prices which apply on its Socony grade.

ATLANTIC REFINING

Pittsburgh, Pa.	16	*	16	*22	14
Philadelphia, Pa.	15	*	15	*21	14
Allentown, Pa.	16	*	16	*22	14
Erie, Pa.	12	*	12	*18	14
Scranton, Pa.	16	*	16	*22	14
Altoona, Pa.	16	*	16	*22	14
Dover, Del.	16	3	19	22	14
Wilmington, Del.	16	3	19	22	14
Providence, R. I.	17	2	19	19	15
Boston, Mass.	17	0	17	17	15
Springfield, Mass.	17	0	17	17	15
Worcester, Mass.	17	0	17	17	15
Hartford, Conn.	19	2	21	22	15
New Haven, Conn.	19	2	21	21	15

*3-cent state tax is collected by retail dealer and paid by him directly to state.

S. O. KENTUCKY

Lexington, Ky.	13	5	18	21	15.5
Louisville, Ky.	14	5	19	22	15
Covington, Ky.	14	5	19	22	15.5
Clarksdale, Miss.	13	4	17	20	12.5
Gulfport, Miss.	††14.5	4	††18.5	21.5	14
Jackson, Miss.	13	4	17	20	13.5
Natchez, Miss.	12.5	4	16.5	19.5	14
Vicksburg, Miss.	12.5	4	16.5	19.5	14
Birmingham, Ala.	14	4	18	21	15.5
Mobile, Ala.	13	4	17	20	15
Montgomery, Ala.*	15	4	19	22	16.5
Atlanta, Ga.	12	4	16	18	†15.5
Augusta, Ga.	15	4	19	22	†16.5
Macon, Ga.	15	4	19	22	†16.5
Savannah, Ga.	12	4	16	18	†14.5
Jacksonville, Fla.°	13	5	18	21	†14
Miami, Fla.°	15	5	20	23	15.5
Tampa, Fla.°	12	5	17	20	14
Pensacola, Fla.°	**14	5	**19	22	15

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.
†Georgia kerosene prices include 1c state tax.
°Florida gasoline prices include ½c inspection fee.
**Both tank wagon prices include 1c city tax at Pensacola, which went into effect Oct. 15, 1926.
††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

S. O. INDIANA

	Gasoline T.W.	Gasoline Tax	Gasoline Total T.W.	Gasoline S.S.	Oil T.W.
Chicago, Ill.	14	2	16	18	12
Decatur, Ill.	8.5	2	10.5	12.5	12.1
E. St. Louis, Ill.	13.1	2	15.1	17.35	11.2
Joliet, Ill.	14.4	2	16.4	18.4	12.3
Peoria, Ill.	10	2	12	12	12.1
Quincy, Ill.	14.2	2	16.2	18.2	11.9
Indianapolis, Ind.	11.2	3	14.2	15.2	13.2
Evansville, Ind.	14	3	17	19	13
South Bend, Ind.	12	3	15	15	13.4
Detroit, Mich.	12.8	3	15.8	17.8	13.7
Grand Rapids, Mich.	12.5	3	15.5	17.5	13.6
Saginaw, Mich.	14.9	3	17.9	19.9	13.8
Green Bay, Wis.	14.6	2	16.6	18.6	12.4
Madison, Wis.	14.3	2	16.3	18.3	12.1
Milwaukee, Wis.	14.1	2	16.1	18.1	11.9
La Crosse, Wis.	15.2	2	17.2	19.2	13
Minneapolis, Minn.	12	2	14	14	12.9
Duluth, Minn.	13.5	2	15.5	17.5	12.9
Mankato, Minn.	15.1	2	17.1	19.1	12.7
Des Moines, Ia.	14	3	17	19	12.3
Davenport, Ia.	12.5	3	15.5	17.5	12.3
Sioux City, Ia.	14.1	3	17.1	19.1	11.9
Mason City, Ia.	14.5	3	17.5	19.5	12.3
St. Louis, Mo.	*13.6	2	15.6	17.9	11.3
Kansas City, Mo.	†12.9	2	14.9	16.9	10.6
St. Joseph, Mo.	†12.5	2	14.5	16.5	11.2
Fargo, N. D.	15	2	17	19	14.9
Grand Forks, N. D.	17.2	2	19.2	21.2	15.2
Minot, N. D.	16.9	2	18.9	20.9	14.9
Pierre, S. D.	15.5	4	19.5	21.5	13.9
Huron, S. D.	12.5	4	16.5	18.5	13.9
Wichita, Kans.	12.8	2	14.8	16.8	10.8
Bartlesville, Okla.	12.8	3	15.8	17.8	10.8

S. O. Indiana Q. D. A. schedule on tank wagon deliveries of gasoline, effective March 3 thru territory, except Wisconsin effective March 4: 50 gals. and over on delivery, 1c discount, except in city of Chicago where 1c discount applies on 100 gals. and over; 6,000 gals. and over per month, 1½c; 10,000 gals. and over per month, 2c; 15,000 gals. and over per month 3c, except latter discount does not apply in Chicago.

Service station discounts: 200 gals. or more per month, and 2400 gals. or more per year, 2c per gal.

March 1, 1c discount on kerosene in 50 gal. dumps thru territory.

*Includes city tax of ½c.
†Includes city tax of 1c.

S. O. NEBRASKA

Omaha, Neb.	14.25	2	16.25	16.25	12.25
McCook	12.75	2	14.75	16.75	11.50
Norfolk	14.75	2	16.75	18.75	12.75
North Platte	15.75	2	17.75	19.75	13.50
Scottsbluff	15.25	2	17.25	19.25	13.00

CONTINENTAL OIL

Denver, Colo.	13	3	16	16	12.5
Pueblo, Colo.	12	3	15	15	14.5
Grand Junction, Colo.	17.5	3	20.5	22.5	18
Casper, Wyo.	14	3	17	19	13
Cheyenne, Wyo.	15	3	18	20	14.5
Butte, Mont.	19	3	22	22	19
Helena, Mont.	19.5	3	22.5	24.5	19
Salt Lake City, Utah	17.5	3½	21	23	17
Boise, Ida.	19.5	4	23.5	25.5	19
Twin Falls, Ida.	19.5	4	23.5	25.5	19
Albuquerque, N. M.	16	5	21	24	17

S. O. CALIFORNIA*

Phoenix, Ariz.	19	4	23	27	21.5
Los Angeles, Cal.	13.5	3	16.5	20.5	15.5
Fresno, Cal.	14	3	17	21	16.5
San Francisco, Cal.	14	3	17	21	15.5
Reno, Nev.	18	4	22	26	19
Portland, Ore.	14.5	3	17.5	21.5	16.5
Seattle, Wash.	14.5	2	16.5	20.5	16.5
Spokane, Wash.	18.5	2	20.5	24.5	20.5
Tacoma, Wash.	14.5	2	16.5	20.5	16.5

*On Oct. 1, t.w. price at all points for spot sales, was advanced 1c. Very large portion of deliveries are under contract carrying above prices. New customers signing contracts and selling only one brand of gasoline, are given prices published in above table.

S. O. LOUISIANA

Little Rock, Ark.	11	5	16	16	12
Alexandria, La.	13	2	15	18	†14
Baton Rouge, La.	12	2	14	17	†12.5
Lake Charles, La.	13.5	2	15.5	18.5	†14
New Orleans, La.	*11.5	2	*13.5	*13.5	*14
Shreveport, La.	13.5	2	15.5	18.5	†13
Lafayette, La.	13	2	15	18	†13.5
Bristol, Tenn.	16	3	19	22	14
Chattanooga, Tenn.	16.5	3	19.5	22.5	15
Knoxville, Tenn.	16.5	3	19.5	22.5	15
Nashville, Tenn.	15	3	18	21	15
Memphis, Tenn.	13.5	3	16.5	16.5	14

*New Orleans gasoline prices include 1c parish tax in addition to 2c state tax, and kerosene prices include 1c state tax and 1c parish tax.
†Kerosene price in Louisiana includes 1c state tax.

S. O. OHIO

	Gasoline T.W.	Gasoline Tax	Gasoline Total T.W.	Gasoline S.S.	Oil T.W.
All Ohio points	14	3	17	19	14

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	3	15	18	9
Oklahoma City	10	3	13	14	9
Tulsa, Okla.	11	3	14	15	9
Fort Smith, Ark.*	11	*3	14	17	12
Little Rock, Ark.	11	5	16	16	12
Texarkana, Ark. *	12	*3	15	18	12
Dallas, Tex.	11	3	14	17	11
Fort Worth, Tex.	11	3	14	16	10
Houston, Tex.	10	3	13	15	15
San Antonio, Tex.	10	3	13	15	10
El Paso, Tex.	11	3	14	15	16

*Within City of Texarkana and Fort Smith, the state tax on gasoline is 3c per gal. conforming with the Texas state tax. In these two districts outside of the city the 5c Arkansas tax applies.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M. & P. Naphtha	Cleaner Naphtha
Chicago	16	18	18
Detroit	17.7	19.7	19.7
Kansas City	16.2	†18.2	†18.2
Milwaukee	16.7	*20.7	*20.7
Minneapolis	*20	*22	*22
St. Louis	15.9	17.9	17.9
New York	...	19	....

*Includes 2c state tax.
†Includes 1c city tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO

	Gasoline T.W.	Gasoline Tax	Gasoline Total T.W.	Gasoline S.S.	Oil T.W.
Toronto	19.5	3	22.5	26	21
Ottawa	19.5	3	22.5	26	21
Cochrane	24.5	3	27.5	36	26
Ft. William	24.5	3	27.5	31	23.5

MANITOBA

Winnipeg	24.5	3	27.5	31	23.5

SASKATCHEWAN

Regina	27.5	0	27.5	32	26.5

ALBERTA

Edmonton	26.5	3	29.5	33	25.5
Calgary	22.5	3	25.5	29	23.5

BRITISH COLUMBIA

Vancouver	21	3	24	28	22

QUEBEC

Montreal	20.5	3	23.5	27	21
Quebec City	22.5	3	25.5	31	23
Three Rivers	22.5	3	25.5	30	23

NEW BRUNSWICK

St. John	24.5	3	27.5	32	24
Moncton	24.5	3	27.5	32	24

NOVA SCOTIA

Halifax	24.5	3	27.5	32	24
Sydney	24.5	3	27.5	32	24

PRINCE EDWARD ISLAND

Charlottetown	24.5	3	27.5	31	24

Note: In districts surrounding these points 1c additional is added to city price.

Contract Commitments Comprise Bulk of Eastern Movement

Staff Special
NEW YORK, Oct. 22

EASTERN gasoline markets experienced a period of relative inactivity this week with spot demand from the jobbing trade off appreciably. Inclement weather together with the fact that the motoring season is nearing an end is credited with being the cause of the slower market this week. Generally speaking, it was reported that jobbers were ordering out their contract commitments quite regularly and that it was this class of goods that comprised the bulk of the current movement.

Markets were somewhat unsettled from a price standpoint this week. Rumors were current throughout the week that U. S. Motor gasoline was being offered in tank cars at various points along the seaboard at prices considerably under those acknowledged to be representative of the general going market.

Delivered prices have been quoted by several of the larger refiners which actually do figure back appreciably less than market prices for goods f.o.b. refineries and seaboard terminals. One instance in particular involved a small quantity of U. S. Motor gasoline which sold at 9.25 cents delivered at Albany and this figures back to 7.75 cents, f.o.b. Bayonne. Several additional transactions of this character were brought to light in the course of the week but a careful survey of the market showed that goods coming under this class of shipment was greatly in the minority.

A sale involving around 1,000,000 gallons of U. S. Motor gasoline was reported to have been made at 7.75 cents, f.o.b. New England refinery, but the goods was for shipment over longer than a 30 day period. As was pointed out last week, several barge transactions on U. S. Motor have been made at 7.75 cents.

One or two events occurred during the past week, however, that were looked upon by the trade as more or less disturbing factors in the current market. A cargo of California U. S. Motor gasoline was purchased for coastwise shipment at 5.875 cents a gallon, f.o.b. California refinery, and a clean bottom was secured at the rate of 63 cents per barrel, or 1.5 cents per gallon, which brings the total cost laid down at New York to 7.375 cents per gallon. For some time past it has been felt that 6 cents might be shaded on the Pacific coast, but the sale aforementioned served as confirmation.

There is already considerable talk about contracts, jobbers and consumers, for 1928, and some that have been closed look none too promising, a number of the trade assert. An unconfirmed report was made that a consumer operating 10 trucks had signed a contract for his 1928 gasoline requirements at 5 cents under tank wagon.

A large volume of kerosene trading was reported this week in New York and Philadelphia. This commodity, which has been comparatively scarce, was more freely offered this week and occasional sales of water white goods were reported at slightly under 7 cents. For the most part, however, sellers were fairly firm to 7 cents.

Inquiries for gas oil were more numerous this week and prices at the majority of northern seaboard cities were slightly firmer. At New York, 28-34 gas oil was 5 cents a gallon but one or two sellers were offering this grade at 4.75 cents. In the New England district, 4.75 cent goods was no longer available, all sellers having advanced their prices to a minimum of 5 cents.

Furnace oil was available at 6 cents on the spot market in the New England district, whereas contracts for this oil were reported to be bringing 6.25 to 6.50 cents.

No changes of consequence were noted in the New York market for bunker oil. Grade C was fairly active at $1.55, New York and Philadelphia and $1.60 at Boston.

Two New Cargo Inquiries Appear As French Close Contracts

Staff Special
NEW YORK, Oct. 22

THE closing of two mixed cargoes for November shipment to France, inquiries for two additional mixed cargoes for last half of November shipment; and a drop of from 5 to 10 cents per barrel in bunker oil prices were the highlights in Gulf export market this week.

Up until a week ago, there had been virtually no demand from foreign buyers for spot cargoes of any grade of oil for over 30 days, and the activity this week served to brighten the spirits of exporters considerably in spite of the fact that the business closed at prices 0.25 cent under quotations that have prevailed for some time past.

Early this week a French buyer purchased approximately 60,000 barrels of 61-63, 390 end point gasoline at 7.875 cents, 64-66, 375 end point gasoline at 8.25 cents and prime white kerosene at 6 cents from a leading Philadelphia refiner for Nov. 10-30 lifting at the Gulf. At the same time, the French subsidiary of a large refiner purchased, in round figures, 15,000 barrels of U. S. Motor gasoline at 7 cents, 25,000 barrels of 64-66, 375 end point gasoline at 8.25 cents and 5,000 barrels of prime white kerosene at 6 cents.

As the market closed today there were two additional inquiries for mixed cargoes from European buyers in the hands of a leading exporter which were not generally known to the trade. One of the inquiries called for approximately 60,000 barrels of U. S. Motor and 64-66, 375 end point gasoline, prime white and water white kerosene for last half of November loading at the Gulf. The business is expected to be closed Monday of next week. Details of the other inquiry could not be learned, but indications were that this business also would be closed early next week.

The United States Shipping Board contracts for its 1928 requirements of bunker oil were closed this week at prices which seemed astonishingly low to a good many of the trade, and it was felt in some quarters that this was mainly because of the drop that prices for spot cargoes and bunkers took. Details of the contracts are not wholly available to the public as yet, but it is generally known that $1.15 per barrel was bid on 1,300,000 barrels of oil at Baton Rouge and that the Board's require-

Exports from Tampico District

Company	August	September
Transcontinental Petroleum Co., (Standard of New Jersey)	742,177	838,788
Pan American Eastern Oil Co.	1,761,479	1,989,852
Mexican Eagle Oil Co., (El Aguila)	683,280	841,879
Cia. Mexicana Holandesa "La Corona"	430,483	281,889
The Texas Co. of Mexico, S. A.	93,290	.....
Mexican Gulf Oil Co.	.....	.....
Sinclair Mexican Companies	718,982	253,953
East Coast Oil Co. of Mexico, S. A. (Southern Pacific)	.....	.....
Pierce Oil Corp.	.....	.....
Mexican Atlas Oil Co.	.....	74,745
La Espuela Oil Co.	23,953	.....
Moctezuma Terminal	.....	.....
Mexican Oil Products Co.	.....	22,657
New England Fuel Oil Co.	.....	43,492
Panuco Boston Oil Co.	64,178	64,398
Empire Gas & Fuel Co.	.....	46,501
Totals	4,520,822	4,458,154

Complete Seaboard Market

(Export markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the years 1924-1925-1926)

Eastern Domestic Markets

(Prices in bulk except where otherwise noted f.o.b. refinery or seaboard plant)

	Oct. 24	Oct. 17
U. S. Motor gasoline, tank cars, New York Harbor	8.00 – 8.25	8.00 – 8.25
U. S. Motor gasoline, tank cars, Philadelphia	8.00 – 8.25	8.00 – 8.25
U. S. Motor gasoline, tank cars, Baltimore	8.00 – 8.25	8.00 – 8.25
U. S. Motor gasoline, tank cars, *Boston	8.00 – 8.25	8.00 – 8.50
U. S. Motor gasoline tank cars, Norfolk	8.00 – 8.25	8.00 – 8.25
U. S. Motor gasoline tank cars, Charleston	7.75 – 8.00	8.00
U. S. Motor gasoline tank cars, Jacksonville	7.50 – 7.75	7.75
U. S. Motor gasoline tank cars, *Providence	8.00 – 8.25	8.00 – 8.50
U. S. Motor gasoline tank cars, Savannah	7.75	7.75
California U. S. Motor gasoline, tank cars, Philadelphia	8.00 – 8.25	8.00 – 8.25
California U. S. Motor gasoline, tank cars, Baltimore	8.00 – 8.50	8.00 – 8.50
41-43 w.w. kerosene, New York	6.75 – 7.00	7.00
41-43 w.w. kerosene, Philadelphia	6.75 – 7.00	7.00
41-43 w.w. kerosene, *Boston	7.00	7.25
28-34 gas oil, New York	4.75	4.75
28-34 gas oil, *Boston	5.00	4.75 – 5.00
38-42 furnace oil, New York	6.00	6.00
36-40 Furnace Oil, *Boston	6.00 – 6.25	6.25
Grade C bunker oil, New York	$1.55	$1.55
Grade C bunker oil, *Boston	$1.60	$1.60
Diesel oil, New York	$2.10	$2.10
Russian 885-890 s.g., 325-330 vis. medicinal	$0.75 –$0.85	$0.75 –$0.85
Russian 870-875 s.g., 150-155 vis. medicinal	$0.67 –$0.77	$0.67 –$0.77
Russian 860-865 s.g., 80-85 vis. medicinal	$0.65 –$0.75	$0.65 –$0.75

*F.O.B. New England refineries and seaboard terminals.

New York Export Market

(Gasoline and kerosene in cases in bulk. Lubricating oils are all Penna. products, prices per gal. in bbls.)

	Oct. 24	Oct. 17
U. S. Motor gasoline	24.40	24.40
43-45, 150 w.w. kerosene	18.15	18.15
42-44, 110 s.w. kerosene	17.15	17.15
CYLINDER OILS		
Bright stock, dark	38.00 –39.00	39.00 –40.00
Filtered D 600	31.00	31.00 –32.00
Filtered E 600 Warren	25.00	25.00 –26.00
Unfiltered 600 s.r.	17.00 –18.00	17.00 –17.50
Unfiltered 650 s.r.	18.50 –19.50	18.50
600 Flash s.r.	20.00 –21.00	22.00
630 Flash s.r.	31.00 –33.00	33.00
RED ENGINE OILS (Vis. 100°)		
300 vis. No. 6½ color	20.00	20.00
250 vis. No. 6 color	19.00	19.00
200 vis. No. 6 color	18.50	18.50
PALE ENGINE OILS (Vis. 100°)		
230 vis. No. 3¾ color	24.00	24.00
180 vis. No. 3¼ color	20.00	20.00
100 vis. No. 2¼ color	15.75	15.75
MOTOR OILS (Vis. 100°)		
600 vis. No. 7 color	35.00	35.00
500 vis. No. 6½ color	33.00	33.00
400 vis. No. 7¼ color	31.00	31 00
300 vis. No. 6 color	30.00	30 00
200 vis. No. 3¼ color	24.00	24.00
MEDICINAL OILS		
875-885 s.g.		
865-870 s.g.		

WAXES (In cents per pound, f.a.s. carload lots)

WHITE CRUDE SCALE (In barrels)	Oct. 24	Oct. 17
122-124 A.m.p.	3.00 – 3.125	3.125– 3.25
124-126 A.m.p.	3.00 – 3.125	3.125– 3.25
FULLY REFINED (In burlap bags)		
123-125 A.m.p. Philadelphia	4.00 – 4.125	4.125– 4.25
125-127 A.m.p.	4.00 – 4.125	4.125– 4.25
128-130 A.m.p.	4.125– 4.25	4.375
130-132 A.m.p.	4.50	4.75
133-135 A.m.p.	*5.50	*5.75
135-137 A.m.p.	*5.75– 6.00	*5.75 – 6.25
YELLOW CRUDE SCALE		
124-126 A.m.p.	2.75 – 2.875	2.875– 3.00

* Prices Nominal

Gulf Export Market

(F.o.b. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. and over, except where otherwise noted.)

GASOLINE	Oct. 24	Oct. 17
U. S. Motor	7.00 – 7.25	7.25 – 7.50
61-63, 390 e.p.	7.875– 8.00	7.875– 8.00
64-66, 375 e.p.	8.25	8.25 – 8.50
U. S. Motor, cases (cargo lots)	$1.60 –$1.65	$1.65
64-66, cases (cargo lots)	$1.75 –$1.80	$1.80
KEROSENE		
44 water white	7.00 – 7.25	7.25
41-43 prime white	6.00 – 6.25	6.25
Water white, cases (cargo lots)	$1.60 –$1.65	$1.60
Prime white, cases (cargo lots)	$1.50 –$1.55	$1.50
DOMESTIC GAS AND BUNKER OILS		
*26-28 gas oil	4.25 – 4.375	4.25 – 4.375
*30-32 gas oil	4.50	4.50
Grade C bunker oil	$1.30 –$1.35	$1.40 –$1.45
Grade C bunker oil, cargoes	$1.18 –$1.20	$1.20 –$1.25

*Translucent thru neck of 4 oz. bottle.

MEXICAN CRUDE AND BUNKER OILS (F.o.b. steamer, Tampico)		
Heavy Panuco crude taxes to be paid	$1.10	$1.15
Grade C bunker oil, for bunkering purposes, taxes paid	$1.35	$1.50

SOUTH TEXAS LUBRICATING OILS (Viscosity at 100°F; cold test 0 (Tanker, f.o.b. Houston)

100 vis. No. 2 unfiltered pale	6.00 – 6.50	6.00 – 6.50
200 vis. No. 3 unfiltered pale	8.00 – 9.00	8.00 – 9.00
300 vis. No. 3 unfiltered pale	9.00 –10.00	9.00 –10.00
500 vis. No. 3½ unfiltered pale	11.00 –11.50	11.00 –11.50
200 vis. No. 5½ red oil	7.00 – 7.50	7.00 – 7.50
300 vis. No. 5½ red oil	8.00 – 8.50	8.00 – 8.50
500 vis. No. 6 red oil	10.00	10.00

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Oct. 24	Oct. 17
Gasoline, U. S. Motor, 53-55 Gravity	6.00 – 6.50	6.00 – 7.00
Gasoline, U. S. Motor, blends and special cuts	7.00 – 8.00	7.00 – 8.00
Gas Oil, 30-34, per bbl.	$0.90 –$1.00	$0.90 –$1.00
Diesel Oil, 27 plus, per bbl.	$0.80 –$1.00	$0.80 –$1.00
Bunker Oil, 14-18, per bbl.	$0.85 –$1.00	$0.85 –$1.00
Fuel Oil, 14-18, per bbl.	$0.80 –$1.00	$0.85 –$1.00
Kerosene, 38-40 w.w., 125-150 flash, in gals.	4.50 – 5.00	4.50 – 5.50
Cased Goods		
Gasoline, U. S. Motor	$1.70 –$1.80	$1.70 –$1.80
Kerosene, 38-40, w.w., 125-150 flash	$1.35 –$1.50	$1.35 –$1.50

ments at this point were taken on at this figure. The total requirements of the Shipping Board involved something like 1,800,000 barrels of oil in cargoes and 4,000,000 barrels in bunkers.

Another important contract for bunker oil over 1928 was closed this week by a leading refiner at the Gulf with a large steamship company. The contract calls for approximately 5,000,000 barrels of Grade C at $1.35 per barrel, delivered New York.

There were no inquiries for spot cargoes of bunker oil reported in the market this week, but quotations were made on Grade C as low as $1.18 a barrel, and other companies, in view of the low prices on Shipping Board contracts, were inviting inquiries and indicating they might take as low as $1.15 for spot cargoes.

For bunkering, Grade C was quoted largely at $1.30, New Orleans, and $1.35 further west on the Gulf, although one buyer reported an offer of $1.25 a barrel for Grade C in bunkers but stated the reason for this was doubtless the fact that the seller was loading a cargo for him.

Gas oil market continued relatively quiet and prices were generally unchanged. Translucent goods was 4.25 to 4.50 cents, price depending on gravity somewhat. A foreign buyer was in the market for a cargo of black gas oil, and a broker offering at 3.625 cents reported he lost the business.

Wax was more freely offered at the Gulf this week with white crude scale quoted at 2.875 to 3.125 cents and fully refined at 3.875 to 4 cents.

Foreign Wax Demand At Standstill

NEW YORK, Oct. 22.—Demand for wax from foreign buyers was virtually at a standstill in the New York market and prices for both white crude scale and fully refineds were off from 0.125 to 0.25 cents.

The market for white crude scale as the week ended stood at 3 to 3.125 cents, but according to reports was comparatively easy at this range. One small lot of scale, approximately 25 tons, sold early in the week at 2.875 cents, New York, and another small quantity was reported to have sold at 3.08 cents, New York, but for the majority of sellers were quoting 3 to 3.125 cents.

Crude Oil Prices, as Posted by Major

(Crude prices for years 1924-1925-1926 in

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Allegheny, N. Y. District)	$2.65
Bradford District Oil in National Transit Lines (Bradford District)	2.65
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	2.55
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	2.55
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	2.50
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	2.25
Keister Grade in National Transit Lines (Butler Co.)	1.10
Cabell Grade in Eureka Pipe Lines (West Virginia)	1.40
Corning Grade in Buckeye Pipe Lines (Ohio)	1.45
Corning, O. heavy grade	1.35
*Somerset Oil in Cumberland Pipe Lines (Kentucky)	1.50
Ragland Grade in Cumberland Pipe Lines (Kentucky)	.95

*Somerset oil run prior to Oct. 1922, takes price of 6 cents lower than above quotations.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines.....$1.50

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective March 14, 1927

Wooster	$1.57	Plymouth	$1.33
Lima	1.71	West. Kentucky	1.33
Waterloo	1.35	*Canadian Petro.	2.11
Indiana	1.48	*Oil Springs	2.18
Princeton	1.60	*Posted by Imperial Oil Ltd.	
Illinois	1.60		

OKLAHOMA, KANSAS And NORTH TEXAS

Prices of Prairie Oil & Gas Co.

(In Oklahoma, Kansas, North and East Central Texas)

Effective March 12, 1927

28-28.9	$1.12	35-35.9	$1.26
29-29.9	1.14	36-36.9	1.28
30-30.9	1.16	37-37.9	1.30
31-31.9	1.18	38-38.9	1.32
32-32.9	1.20	39-39.9	1.34
33-33.9	1.22	40-40.9	1.36
34-34.9	1.24	41-41.9	1.38
42-42.9	$1.40	48-48.9	$1.52
43-43.9	1.42	49-49.9	1.54
44-44.9	1.44	50-50.9	1.56
45-45.9	1.46	51-51.9	1.58
46-46.9	1.48	52 and above	1.60
47-47.9	1.50		

Above schedule met on March 12, by Gulf, Mid-Continent Pet. Corp., and Empire; by Carter, Humble and the Texas Co. on March 14.

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

March 14, same schedule as Prairie in above fields.

Mirando, Tex.....$1.00

Magnolia Petroleum Co.

(In Oklahoma, Kansas and North and East Central Texas)

Effective Sept. 14, Magnolia posted same price schedule as Prairie in above fields except that Magnolia is paying $1.05 for all oil below 30 gravity.

Corsicana heavy.....$1.00

Carter Oil Co.

(Oklahoma and Kansas)

March 14, same schedule as Prairie.

PANHANDLE, TEXAS

Humble Oil & Refining Co.

Effective Aug. 23

Hutchinson, Carson and Wheeler Counties..$0.75

Pampa, Gray County, Effective March 14:

28-28.9	$ .80	37-37.9	$ .98
29-29.9	.82	38-38.9	1.00
30-30.9	.84	39-39.9	1.02
31-31.9	.86	40-40.9	1.04
32-32.9	.88	41-41.9	1.06
33-33.9	.90	42-42.9	1.08
34-34.9	.92	43-43.9	1.10
35-35.9	.94	44 and above	1.12
36-36.9	.96		

WEST TEXAS

Humble Oil & Refining Co.

Effective Aug. 23

Crane, Upton, Crockett and Pecos Counties...$0.60

NORTH LOUISIANA — ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana

Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton and De Soto

Effective March 14, 1927

Below 28	$1.10	40-40.9	$1.36
28-28.9	1.12	41-41.9	1.38
29-29.9	1.14	42-42.9	1.40
30-30.9	1.16	43-43.9	1.42
31-31.9	1.18	44-44.9	1.44
32-32.9	1.20	45-45.9	1.46
33-33.9	1.22	46-46.9	1.48
34-34.9	1.24	47-47.9	1.50
35-35.9	1.26	48-48.9	1.52
36-36.9	1.28	49-49.9	1.54
37-37.9	1.30	50-50.9	1.56
38-38.9	1.32	51-51.9	1.58
39-39.9	1.34	52 and above	1.60

*Smackover, below 24	$0.90
* do 24 and above	1.15
Bellevue	1.25
Cotton Valley	1.00
**Urania, La	.90
†East El Dorado	1.00

**Posted by Louisiana Oil Refining Corp.

†Posted by Magnolia Petroleum Co.

*Smackover prices posted on Sept. 20 by S. O. La., Magnolia, Shreveport-El Dorado Pipe Line and Atlantic Oil Producing Co.; on Sept. 23 by The Texas Co. on Sept. 17, La. Oil Refg. Corp.

STEPHENS, ARKANSAS

Atlantic Oil Producing Co. and Louisiana Oil Refining Corp.

Below 28	$1.00	30-30.9	$1.06
28-28.9	1.02	31-31.9	1.08
29-29.9	1.04	32 and above	1.10

GULF COASTAL

Posted by Humble Oil & Refining Co.

Effective March 14

Grades A	$1.20	29-29.9	$1.25
Grades B:		30-30.9	1.27
Below 25	1.15	31-31.9	1.29
25-25.9	1.17	32-32.9	1.31
26-26.9	1.19	33-33.9	1.33
27-27.9	1.21	34-34.9	1.35
28-28.9	1.23	35 and above	1.37

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling and Pierce Junction. All other fields are Grades A only.

New Contracts Give Strength To Natural Gasoline

Staff Special

LOS ANGELES, Oct. 22

NATURAL gasoline was the strongest product in the petroleum market in California during the past week, due to signing of a number of period contracts by manufacturers the past few weeks. The signing of new contracts left very little spot goods on the market, and the few spot purchases being made are at prices ranging from 9 to 10 cents, with 9½ cents as the favored asking price. One manufacturer the past week signed a contract with an Independent refiner for his natural gasoline output over a period of 6 months at 9½ cents, and the manufacturer refused to make the contract to cover a year's period. The production of natural gasoline in California is slightly above ordinary demands, but contracts are being freely signed.

The tank car market for gasoline remains unchanged. The spread is not so wide as previously. Asking price for shipment outside of the state is usually 7 cents, although some of the refiners are asking more, up to 7½ to 8 cents, but those asking the higher price are not anxious to sell, or have a place for most of their product. The tank car movement is almost entirely in the hands of the Independent refiners, with the major companies obtaining very little of this character of orders.

Gasoline for export holds around 6 cents with some of the larger companies asking up to 7 cents. But little if any is moving at more than 6 cents. It is generally reported that some of the gasoline moving to the east coast is leaving Los Angeles harbor at a net price of slightly less than 6 cents. Tanker rates to east coast range from 65 to 70 cents a barrel for clean ships. This compares with 19 to 20 cents from Gulf points to New York.

The fuel oil bids for supplying the Shipping Board the coming fiscal year, showed a low of 76½ cents by the Richfield, except for bunkers, which were 2 cents higher. Other bids ranged up to $1.00. Some thought these bids would serve to strengthen the fuel oil market, but apparently the market has not been affected one way or the other. Fuel oil for export is still quoted at 80 cents up, with bunkers ranging upward from 85 cents. Fuel oil in tank cars still can be purchased at 65 to 80 cents.

Kerosene prices have not strengthened on the west coast in sympathy with east coast prices. There has been a tendency to ask slightly higher prices, but plenty of kerosene is still available at 4½ to 5 cents for export and at 5 to 5½ cents for tank car movement.

The local retail situation is holding fairly steady with no new price

Purchasers, in All Fields (in Effect October 24)

OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

(Effective March 14)

Grades A	$1.20	*Grades B	$1.15
‡Grades B (light crude):			
35-35.9	$1.37	38-38.9	$1.43
36-36.9	1.39	39-39.9	1.45
37-37.9	1.41	40 and above	1.47

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co. and Midwest Refining Co.

(Salt Creek prices effective March 12)

‡Salt Creek	29-29.9	$1.14
" "	30-30.9	1.16
" "	31-31.9	1.18
" "	32-32.9	1.20
" "	33-33.9	1.22
" "	34-34.9	1.24
" "	35-35.9	1.26
" "	36-36.9	1.28
" "	37 and above	1.30
Elk Basin		1.33
Grass Creek light		1.33
Big Muddy		$1.25
Lance Creek		1.33
Rock Creek		1.25
Mule Creek		1.30
Rex Lake		1.10
‡Osage		1.33
‡Cat Creek, Mont.		1.33
Sunburst, Mont.		1.35
‡Hogback, N. Mex.		1.38
Artesia, N. Mex.		1.00

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

The Texas Co. buys Salt Creek and Big Muddy crude.

CALIFORNIA

Standard Oil Co. of California

Santa Maria and Ventura Posted by Union Oil Co.

Gravity	Signal Hill Seal Beach Huntington Beach	Inglewood Torrance	Whittier La Habra	Newhall, McKittrick, Kern River	Olinda-Brea Canon, Richfield	Athens-Rosecrans Dominguez	Montebello	Coyote Hills	Santa Fe Springs	Midway Sunset Buena Vista & Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria	Ventura
14-14.9	$ .85	$ .85	$ .85	$ .75	$ .85	....	$ .85	$ .85	....	$ .75	$ .75	$ .75	$ .75	$ .85	$ .85
15-15.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
16-16.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
17-17.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
18-18.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
19-19.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
20-20.9	.85	.85	.85	....	.85	....	.85	.85	....	.77	.77	.76	.76	.85	.85
21-21.9	.86	.86	.85	....	.86	....	.85	.86	....	.79	.79	.77	.77	.85	.85
22-22.9	.87	.87	.85	....	.87	....	.85	.87	....	.81	.81	.78	.78	.85	.85
23-23.9	.88	.88	....	....	.88	....	.85	.88	....	.83	.83	.79	.79	.85	.85
24-24.9	.89	.89	....	....	.89	$ .89	.85	.89	.85	$ .85	.85	.80	.80	.85	.85
25-25.9	.90	.90	....	....	.90	.90	.86	.90	.85	.87	.87	.81	.81	.86	.86
26-26.9	.92	.92	....	....	.92	.92	.87	.91	.85	.89	.89	.83	.82	.87	.87
27-27.9	.94	.94	....	....	.94	.94	.88	.92	.85	.91	.91	.85	.83	.88	.88
28-28.9	.96	.96	....	....	.96	.96	.89	.93	.86	.93	.93	.87	....	.89	.89
29-29.9	.98	....	....	....	.98	.98	.90	.94	.87	.96	.96	.89	....	.91	.91
30-30.9	1.00	....	....	....	1.00	1.00	.91	.95	.88	.99	.99	.91	....	.93	.93
31-31.9	1.03	....	....	....	....	1.03	....	....	.89	1.02	1.02	.93	....	....	.95
32-32.9	1.06	....	....	....	....	1.06	....	....	.91	1.05	1.05	.95	....	....	.97
33-33.9	....	....	....	....	....	1.09	....	....	.93	1.08	1.08	.97	....	....	.99
34-34.9	....	....	....	....	....	1.12	....	....	.95	....	1.11	.99	....	....	1.01
35-35.9	....	....	....	....	....	1.15	....	....	.97	....	....	1.01	....	....	1.03
36-36.9	....	....	....	....	....	1.18	....	....	.99	....	....	....	....	....	1.06
37-37.9	....	....	....	....	....	1.21	....	....	1.01	....	....	....	....	....	1.09
38-38.9	....	....	....	....	....	1.24	....	....	1.03	....	....	....	....	....	1.12
39-39.9	....	....	....	....	....	1.27	....	....	1.06	....	....	....	....	....	1.15
40-40.9	....	....	....	....	....	1.30	....	....	1.09	....	....	....	....	....	....
41-41.9	....	....	....	....	....	1.33	....	....	1.12	....	....	....	....	....	....
42-42.9	....	....	....	....	....	1.36	....	....	1.15	....	....	....	....	....	....

*Union Oil Co. also purchases Long Beach Crude and is maintaining the same gravity and price schedule in that field as the Standard maintains in Signal Hill and Huntington Beach fields. The Union also buys and pays the same prices as the Standard in the Rosecrans-Dominguez fields, on gravities ranging from 14 degrees to and including 24.9 degrees and in Santa Fe Springs, on gravities ranging from 20 to and including 23.9 degrees.

cutting. In fact, there are just two prices in effect in California. Gasoline sold by major refiners is selling at 20½ cents, service station price, while the product sold by the smaller companies is moving to consumer at 18½ cents. All new contracts are being signed at 4 cents differential. A service station that does not stick to any one company only is allowed 3 cent profit, and as a result of this practice, most of the resellers are signing up to obtain that additional 1 cent profit.

Gasoline Stocks Decrease In September

NEW YORK, Oct. 22.—Pipe line, tank farm and refinery stocks of crude east of the Rockies increased in September, while stocks of all refined products decreased except gas and fuel oil, which increased 1,697,000 barrels, according to American Petroleum Institute.

Pipe line and tank farm gross domestic crude stocks increased 5,235,000 barrels, as compared with an increase of 6,564,000 barrels in August

Refinery stocks of crude oil increased 1,445,000 barrels in September, as compared with an increase of 630,000 barrels in August, at plants covering approximately 87 per cent of the country's operating capacity east of California.

Gasoline stocks decreased 2,257,000 barrels in September, while gasoline stocks in August decreased 3,987,000 barrels.

Kerosene stocks in September decreased 523,000 bbls., and lube stocks 30,000 barrels.

Total refinery stocks showed net decrease of 819,000 barrels.

* * *

LOS ANGELES, Oct. 21.—Stocks of refinable crude in California during September declined 906,046 barrels, according to monthly report, just issued by Pacific Coast office of American Petroleum Institute. Total refinable crude stocks at end of month were 23,025,124 barrels against 30,308,093 barrels same date one year ago.

Stocks of heavy crude, including all grades of fuel, totaled 93,390,070 barrels, an increase of 188,391 barrels, and compared with total of 88,572,233 barrels same date one year ago.

Gasoline stocks totaled 12,329,195 barrels, a decrease of 57,474 barrels, and compared to 10,545,392 barrels, end of September, last year.

Daily average production of crude oil in California during September was 635,483 barrels, an increase of 13,576 barrels over August figures. Total of 339 wells were drilling at end of September, a decrease of six. Of total drilling wells, 131 were in unproven territory. Seventeen dry holes were reported during September and 13 old producers were abandoned.

Gulf Coastal Lubes Quiet

HOUSTON, Oct. 24.—Gulf Coastal lubricant markets are again quiet at unchanged prices. Competition from other trade territory is credited with preventing the appearance of anticipated strength. Generally, however, manufacturers regard market conditions as more favorable than they were a month ago.

Lax View of Accident Prevention Would Defeat Safety Movement

TULSA, Oct. 24

THE safety movement in the oil industry will be defeated if a too conservative view is taken of what accidents are preventable, D. J. Wallace, director of the Petroleum Safety Council of the Mid-Continent Oil & Gas Association, told the Panhandle Safety Association in a message he sent to that organization's meeting at Borger, Tex., on Oct. 19.

At least two thousand persons tried to get into the Borger Coliseum October nineteen to attend the meeting of the Panhandle Safety Association. The Hall will hold only twelve hundred and was packed from end to end so many were turned away. The meeting was the largest which has been held since the safety movement was begun by the Mid-Continent Oil and Gas Association.

All the safety movement can do is to eliminate preventable accidents but there should be a most liberal interpretation of the word preventable.

To illustrate his point Mr. Wallace gave an analysis of an accident which was reported last month in central Texas. Two men were installing a 6-inch overhead line, working from a small scaffold, when the chain on the tongs broke. Both men were thrown to the ground. One suffered a broken back and the other a dislocated shoulder. In his paper for the Panhandle meeting Mr. Wallace said:

"An investigation of this accident would show the cause as one or more of the following: improper scaffold, the use of too small tongs or chain in bad condition. The use of an improper scaffold still causes some accidents but I think does not need to be considered in the present case.

"If the accident was due to failure of the chain because of wear it would be classed as preventable because proper inspection of tools would have prevented it. The fact that the wear on chains such as used on tongs is hidden is no excuse for failure to find it because the different sizes are standard length when new and all that is required is to know the amount of stretch allowable before discarding the chain. The stretch is determined by measuring carefully from the center of the first link pin next to the jaws to the center of the first pin in the last working link in the chain. The manufacturers of the tongs you are using will give you all the necessary dope to make this inspection.

"If the failure was due to breaking of a practically new chain which had not been stretched, the fault would be with the manufacturer and he should be notified at once. Fortunately, this does not happen once in a blue moon with tools manufactured by responsible firms.

"Accidents due to poor house keeping are all preventable, and this is true also of those due to failure to provide safeguards, lack of inspection and maintenance, lack of instruction and, the improper use of tools or devices."

The Panhandle Safety Association meeting was featured also by talks by C. L. Swim of the Skelly Oil Co. and Ray E. Miller of the Marland companies, two first aid team demonstrations and a number of boxing contests and a wrestling match.

Refuses to Extend Time For Drilling Well

By Special Correspondent

WASHINGTON, Oct. 20.—Overproduction of petroleum, according to Edward C. Finney, first assistant secretary of the department of the interior, furnishes no reason for the department to set aside the provisions of the national leasing law so that production of oil from public land will be reduced.

Therefore Mr. Finney told Thomas J. Moloney to think of some other reason for asking for a suspension of the law requiring the revocation of his permit to explore and exploit oil and gas lands located by him within the terms of his prospecting permit covering Secs. 25, 26, 27 and 28, T. 3S., 6 P.M. in Colorado.

Mr. Finney so ruled last July before the agitation for conservation legislation became so pronounced as within the past week. However, in the routine of such things the ruling was made public only a few days ago. Mr. Finney affirmed a decision on the subject made by the General Land Office and taken to him on appeal.

Last May Moloney was told to show cause why his permit should not be revoked for failure, on his part, to comply with the requirements of the law in respect of drilling.

Moloney answered that because of the overproduction of oil and the inaccessibility of the land he had not been able to procure the capital to exploit the land by drilling. He said that it would not be in the public interest to drill now and bring in more oil. The General Land Office held that that was a confession that he personally did not have the means for drilling on the permit area. It said that if no requirements were to be made of permittees and lessees within a given period, permits should not be issued and no one should be allowed in such a period to obtain any preference right by filing application therefor.

Natural Gasoline Test Methods Changed

Staff Special

TULSA, Oct. 24.—The American Society for Testing Materials has made the tentative test method for obtaining the distillation range of natural gasoline its standard method. The method will bear the number D 216-27. While carried as a tentative method the designation was Method D 216-25T.

The society also has changed its tentative method for taking the corrosion test of gasoline to allow a very slight discoloration of the copper. As a result of this change the Association of Natural Gasoline Manufacturers will change its official specifications on Nov. 1 to comply with the new method as recommended by Committee D 2. The new method bears the designation Method D 130-27T. The old method was known as Method D 130-22T.

Los Angeles Shipments

LOS ANGELES, Oct. 22.—Bulk movement of petroleum products out of Los Angeles harbor week ended Oct. 15 to points outside Pacific Coast trade territory averaged 174,117 barrels against 264,182 barrels previous week. Products were divided as follows: crude 224.664 barrels; fuel oil, 670,907 barrels; gasoline, 303,936 barrels, and Diesel, 19,311 barrels.

Total of 603.610 barrels of fuel and all of the Diesel went to Pacific foreign. All of the crude in addition to 67,297 barrels of fuel and 174,936 barrels of gasoline went to Atlantic domestic. Atlantic foreign drew two cargoes of 129,000 barrels of gasoline.

Cleveland Stock Market

October 21

	Par Value	Bid	Asked	Last Sale
Canfield Oil Co.	100	...	...	...
do pfd	100	100	...	100
Fred G. Clark	10	...	3	3¼
National Refining Co.	25	34	35	35
do pfd	100	130	...	130
Paragon Refining Co.	25	8½	9	8
do pfd	100	91	95	90

x Ex-Dividend

New York Curb Bonds

Week Ending Oct. 21

	High	Low	Last	Ch'ge
Cities Service 5s '66	89⅜	89⅜	89⅜	— ⅛
Cities Service 5⅛s '42	93⅜	93⅜	93⅜	0
Cities Service 6s '66	101½	101½	101½	0
Empire Oil 5⅛s	92½	92½	92½	0
Independent Oil 6s '39	93⅞	93⅝	93⅞	+ ⅜
Phillips Pet. 5¼s '39	95	95	95	0
Pure Oil 6⅛s '38	103½	103½	103½	— ⅜
Pure Oil 5⅛s '37	99⅜	99⅛	99⅜	+ ⅛
S. O. N. Y. 6⅛s '33	104½	104⅛	104½	+ ⅛
Trans. Cont. Oil 7s '30	109⅜	109¾	109¾	— ¼
Valvoline 7s '37	105½	105½	105½	+ ¾

Transactions in Oil Shares on New York Stock Exchange

1926 High	1926 Low	1927 High	1927 Low	Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Oct. 22 Sales	First	High	Low	Last	Change
32⅜	24¼	37⅝	27⅝	(sh) 916,675	N.P.	Amerada Corp.	50cQ	July 30, 27	6,900	29	30⅜	28⅞	30	+ ⅛
74	39⅞	64⅛	35⅛	(sh) 209,180	N.P.	American Republics	.....	.....	2,600	46¾	46¾	42½	45	— 1⅜
59½	44⅜	50¼	40	$ 56,000,000	$25	Associated Oil	50cQ	Sept. 24, 27	200	35	35	35	35	— 5
128⅜	97	131⅜	107	50,000,000	100	Atlantic Refining	$1Q	Sept. 15, 27	16,800	116	117½	113	115	— 1
120	115½	118½	115¼	20,000,000	100	do pfd	$1.75Q	Aug. 1, 27	.....	.....	.....	.....	.....	.....
33¼	23½	35¼	20¾	25,000,000	25	Barnsdall Corp. A	62½cQ	July 15, 27	8,100	21⅜	22⅛	21⅛	21¾	+ ¼
29½	22½	32½	20½	3,842,400	25	do B	62½cQ	July 15, 27	300	20½	21	20½	21	0
68⅛	29¾	32⅞	20	51,523,950	25	California Petroleum	25cQ	Sept. 1, 27	10,300	20⅜	22	20⅛	21⅝	+ 1⅜
94¼	50	96¾	65	24,355,000	100	General Asphalt	.....	.....	79,800	84⅛	84⅜	73¼	77⅜	— 6¼
140½	94⅞	144⅞	107¼	6,874,200	100	do pfd	$1.25Q	Sept. 1, 27	1,500	125	127⅛	120	120	— 8½
72	50¼	175	60⅛	25,000,000	100	Houston Oil	.....	.....	179,700	170	172½	141½	142¼	—10
84	19⅜	32¾	17⅜	(sh) 500,000	N.P.	Independent Oil & Gas	25cQ	Oct. 31, 27	24,300	21⅛	23¼	20½	22½	+ 1½
13¾	7¼	11¾	7½	$ 3,280,340	$10	Indian Refining	.....	Dec. 15, 20	22,600	8½	10½	8	10	+ 1½
12½	8	11⅞	7¾	4,550,110	10	do ctfs	.....	.....	10,700	8	9¼	7¾	9¼	+ 1⅜
104	90	112	99	2,296,400	100	do pfd	.....	Dec. 15, 21	300	99	101	†99	101	— 3
24½	19¼	34¾	20½	(sh) 3,992,067	N.P.	Lago Oil & Transport	75cQ	Aug. 1, 27	9,200	32¾	33¼	31½	32½	— ½
19¼	12	18⅜	10½	(sh) 1,131,290	N.P.	Louisiana Oil Refining	.....	.....	3,600	10⅝	11	10½	10½	— ⅛
98	93	97	90	$ 4,000,000	$100	do pfd	$1¾Q	Aug. 15, 27	110	90	90⅛	90	90	— ⅝
28⅛	16½	22¾	12	(sh) 330,000	N.P.	Maracaibo Oil	.....	.....	1,400	13½	13¾	12	13	— ¾
63⅜	49¼	58½	31	(sh) 2,316,401	N.P.	Marland Oil Co.	.....	Mar. 31, 27	37,400	33⅝	35	32½	34⅛	+ ⅜
250	225	250	200	$ 45,942,800	$100	Mexican Petroleum	$3Q	Oct. 20, 27	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	12,000,000	100	do pfd	$2Q	Oct. 20, 27	.....	.....	.....	.....	.....	.....
13¾	6	9¼	3	(sh) 945,839	N.P.	Mexican Seaboard	.....	Nov. 15, 24	2,400	4⅛	4⅝	4	4¼	— ⅛
37	27½	39⅞	26⅝	(sh) 1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug. 1, 27	11,400	26¼	27⅜	25⅝	26¾	+ ¼
104¼	90	105	97	$ 6,718,000	$100	do pfd	$1.75Q	Sept. 1, 27	100	104	104	104	104	0
2½	¾	3¾	1⅝	24,435,000	10	Middle States	.....	July 1, 23	3,900	2⅛	2¼	2	2	— ⅛
1⅝	⅝	2¾	1⅛	5,356,660	...	do ctfs	.....	.....	2,100	1⅞	1⅞	1¾	1¾	0
2¼	1	1⅞	1	(sh) 3,500,000	N.P.	Pacific Oil	.....	.....	4,700	1⅜	1⅜	1⅜	1⅜	+ ⅛
76½	56½	65⅞	45¼	$ 48,807,500	$ 50	Pan American P. & T.	$1Q	Oct. 20, 27	6,200	48¼	48¼	46¾	46½	— 1⅝
78⅝	56¾	66⅜	45⅝	121,094,850	50	do B	$1Q	Oct. 20, 27	20,800	49½	49¼	47	47½	— 2⅛
46	30	37⅞	16¾	(sh) 400,000	N.P.	Pan American Western B.	.....	Jan. 30, 27	4,900	17⅛	18⅜	17¼	18⅛	— ⅜
62	4½	18⅞	8	(sh) 198,770	N.P.	Panhandle P. & R.	.....	.....	4,300	10	10⅞	9⅛	10¼	+ ⅜
99⅜	51	83¾	58¾	$ 2,935,200	$100	do pfd	.....	July 2, 23	500	60	60½	60	60½	— 6½
57⅛	40	60¼	36¼	(sh) 2,406,796	N.P.	Phillips Petroleum	75cQ	Oct. 1, 27	67,700	38¼	42	38¼	41⅜	+ 2⅝
1⅞	½	1⅜	½	$ 29,622,925	$ 25	Pierce Oil Corp.	.....	.....	500	½	½	½	½	0
27⅛	11⅞	24	13½	15,000,000	100	do pfd	.....	Feb. 1, 22	500	16½	16½	16	16	— ½
7	2¼	5½	2½	(sh) 2,500,000	N.P.	Pierce Petroleum	.....	.....	4,600	3⅝	3⅝	3½	3½	— ½
20¾	11	33⅞	16¾	$ 37,450,850	$50	Producers & Refiners	.....	Sept. 15, 23	5,400	27½	27½	25⅞	26⅛	— 1⅝
41¾	30¾	50	36⅞	2,845,350	50	do pfd	.....	May 1, 25	240	42½	42½	41⅜	41¾	— 2⅜
31	25¼	33½	25	75,939,250	25	Pure Oil Co.	‡37½cQ	Sept. 1, 27	13,200	25¾	25⅝	25	25½	+ ⅛
112¾	106	114	111⅜	13,000,000	100	do 8% pfd	$2Q	Oct. 1, 27	100	114	114	114	114	0
57⅜	47⅜	58	45¼	(sh) 616,605	13.40	Royal Dutch, N. Y. shares	$1.80	Aug. 2, 27	1,400	46⅜	46⅜	45½	46	— ½
40⅝	40½	47⅞	41⅜	(sh) 78,389	F2	Shell Transport & T.	$1.45	July 22, 27	100	42	42	42	42	+ ⅝
31	24	31¾	25	(sh) 10,000,000	N.P.	Shell Union Oil	35cQ	Sept. 30, 27	4,000	25	25¼	24⅝	25⅛	+ 5⅛
114	103	111	107½	$ 18,350,400	$100	do pfd	$1½Q	Aug. 15, 27	.....	.....	.....	.....	.....	.....
28⅝	15½	22¾	14¼	7,208,080	10	Simms Petroleum	.....	Apr. 1, 27	7,900	17	17⅜	16¾	17	0
24¼	16⅜	22⅜	15⅛	(sh) 4,501,339	N.P.	Sinclair Consolidated	.....	May 31, 24	30,700	15¼	16	†15⅛	15⅞	+ ⅜
99½	90	103¼	97	$ 16,907,000	$100	do pfd	$2Q	Aug. 15, 27	500	99¼	100	99⅛	100	+ ¼
37¼	26⅜	37⅜	24⅛	27,396,590	25	Skelly Oil Co.	50cQ	Sept. 15, 27	4,900	25¾	26½	25¾	26½	+ ½
63¾	52⅝	60¾	50⅜	(sh) 13,016,434	N.P.	S. O. California	62½cQ	Sept. 15, 27	29,700	53⅜	55⅛	53	54⅞	+ 1⅝
46⅝	37⅜	43¾	35⅛	$ 606,243,050	$25	S. O. New Jersey	‡25cQ	Sept. 15, 27	22,300	39⅛	39⅜	38⅜	39	— ⅛
33¼	32½	34⅛	29¾	424,348,275	25	S. O. New York	40cQ	Sept. 15, 27	21,800	30¾	30⅞	30⅛	30¾	+ ⅛
41⅝	30⅜	34⅞	30	(sh) 1,171,508	N.P.	Sun Oil	25cQ	Sept. 15,27	12,100	31⅝	31⅝	30⅜	30½	— ½
.....	.....	100¼	99	$ 5,000,000	$100	do pfd	$1.50Q	Sept. 1, 27	100	100	100	100	100	— ¼
5¼	1	6½	3½	(sh) 1,121,368	N.P.	Superior Oil Corp.	.....	Dec. 20, 20	8,800	3⅝	3¾	3⅝	3⅝	+ ⅛
57⅞	53⅛	58	45	$ 180,428,225	25	The Texas Corp.	75cQ	Oct. 1, 27	31,900	50¼	51	49⅝	50½	— ½
19½	12	18⅞	12	8,380,340	10	Texas Pacific Coal & Oil	15c	Sept. 30, 27	13,200	13¾	14⅛	13⅛	13¼	— ½
39¾	37	29⅛	21¾	(sh) 2,168,264	N.P.	Tide Water Oil Co.	20cQ	Sept. 30, 27	100	21¾	21¾	†21¾	21¾	— ¼
103	87¼	89¾	86	$ 20,705,200	$100	do 5% pfd	$1.25Q	Aug. 15, 27	1,100	87½	87½	87½	87½	— 1½
....	....	19⅛	15⅜	(sh) 4,795,934	N.P.	Tide Water Associated	.....	Aug. 1, 27	17,900	15⅝	16⅜	15½	16	+ ⅜
....	....	90¾	85	$ 72,795,900	$100	do pfd.	$1.50Q	Oct. 1, 27	3,900	85	86	85	85	0
5¼	3	9¾	3¾	(sh) 3,742,029	N.P.	Transcontinental Oil	.....	.....	116,100	7⅝	8¼	7	7⅜	— ⅛
58⅜	37¼	56½	39⅝	$ 40,759,475	$ 25	Union Oil of California	50cQ	Aug. 10, 72	30,300	43	45⅜	42⅛	44⅜	+ 1⅛
120⅜	84¼	116½	94	30,734,000	100	Union Tank Car Co.	$1.25Q	Sept. 1, 27	1,000	109	110½	109	110½	+ 1¼
.....	.....	28½	24½	(sh) 240,000	N.P.	Warner Quinlan	50cQ	Oct. 1, 27	1,200	25¼	25⅜	24⅝	25	— ⅛
29¾	25⅛	27½	21¾	(sh) 490,000	N.P.	White Eagle Oil & Refining	50cQ	Oct. 20, 27	2,400	22¼	22¼	†21¾	21¾	— ⅝

*New High †New Low xEx-Dividend ‡Also extras Total Sales 932,750

New York Bonds

	High	Low	Last	Ch'ge
Amer. Rep. deb. 6s	100	100	100	0
Assoc. Oil Gold 6s	102¾	102⅝	102⅝	0
Atlantic Refg. deb. 5s	102½	101½	101¾	+ ¼
Barnsdall Corp. 6s	92¾	97½	97⅝	— ⅜
Barnsdall Corp. 6s ex war	90⅜	90	90⅜	+ ⅜
Cal. Pet. 5s	103	103	103	+ ½
Cal. Pet. 5½s	100	99½	99⅞	+ ⅛
General Asphalt 6s	108½	107½	107½	—1½
General Petroleum 5s	101½	101½	101½	0
Humble Oil & Refg. 5½s	102⅝	102½	102⅝	+ ⅛
Humble Oil 5s	100	99⅝	99⅞	0
Mid-Cont. Pet. 6½s	105	104¾	104¾	0
Pan Amer. P & T 7s	106	105½	106	+ ⅛
Pan Amer. P & T 6s	102¾	102½	102½	0
Pan Amer. P & T 6s	93⅛	92¾	93	+ ¼
Simms Pet. cvt. 6s	100¼	100	100¼	+ ¼
Sinclair Con Oil Col 7s	99¾	99	99⅛	— ½
Sinclair Con Oil Con 6½s	94½	94	94	— ¼
Sinclair Crude Oil 6s	100⅜	100⅛	100⅜	0
Sinclair Oil 6s	98⅞	98¼	98⅜	0
Sinclair Pipeline 5s	94¼	93¼	93¾	— ½
Skelly Oil 5½s	95¼	94¾	95	0
S. O. of N. Y. 4½s	96¾	96	96¼	— ⅛
S. O. of N. J. deb. 5s	103¼	102¾	102⅞	— ⅛
Union Oil of Cal. 6s-A	108⅞	108⅞	108⅞	— ⅛
Union Oil of Cal. 5s-C	98⅞	98½	98½	0

Oil Well Supply Co., Pittsburgh, Pa., recently shipped 20 production hoists to Russia. These hoists were built at the Imperial Works of that company and are designed for extreme service.

PITTSBURGH STOCK EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Oct. 21 First	High	Low	Last	Ch'ge
8½	5¾	9⅞	6⅛	$ 10	Arkansas Nat. Gas	7,650	8¾	9	8½	9	+ ¼
90½	79¾	98⅜	84	100	Columbia Gas	.....	.....	.....	.....	.....	.....
101⅜	95	107	100	100	do pfd	.....	.....	.....	.....	.....	.....
17	12½	15	9½	10	Devonian Oil	.....	.....	.....	.....	.....	.....
					Dixie Gas & Util.	860	10½	11¼	10	11¼	+ ¼
116½	112	116¾	115	100	Duquesne Lt. 7% pfd.	50	116¾	116¾	116½	116½	0
10	5⅛	12¼	6	N.P.	Houston Gulf Gas	350	10⅜	10⅜	10	10	— 1
46	39	52½	37¼	$ 25	Lone Star Gas	13,773	49½	*52½	49½	51¾	+ 2¼
47⅜	33⅛	22¾	22¼	25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
47½	42	21⅝	21	...	do ctfs	.....	.....	.....	.....	.....	.....
6¾	5	6	5	...	Ohio Oil & Gas	.....	.....	.....	.....	.....	.....
34	21	21	21	25	Oklahoma Nat. Gas	.....	.....	.....	.....	.....	.....
21	19¼	23⅝	20¼	....	do ctfs	537	22⅛	22¼	22	22⅛	0
5⅜	3⅛	3⅜	3	5	Pittsburgh Oil & Gas	400	3¼	3¼	3¼	3¼	0
10	7½	8	6	10	Salt Creek Cons.	150	6⅛	6⅛	6	6⅛	+ ⅛
27	8	26½	17	10	Tidal Osage	.....	.....	.....	.....	.....	.....
45	40	43	33	N.P.	Waverly Oil Wks. "A"	.....	.....	.....	.....	.....	.....

PITTSBURGH CURB EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Oct. 21 First	High	Low	Last	Ch'ge
3⅜	2½	3½	2¾	$ 5	Columbia Synd.	.....	.....	.....	.....	.....	.....
20	.06	.18	.18	5	Duquesne Oil	.....	.....	.....	.....	.....	.....
91½	85	94	88	25	Gulf Oil Corp.	.....	.....	.....	.....	.....	.....
79	79	105	93	100	Houston Gulf Gas pfd	.....	.....	.....	.....	.....	.....
12	7½	10¾	6¼	N.P.	Leonard Oil & Dev.	.....	.....	.....	.....	.....	.....
30¼	29	32	31¼	$ 25	Oklahoma Gas	.....	.....	.....	.....	.....	.....
2	.15	2.70	.75	10	Omar Oil & Gas	.....	.....	.....	.....	.....	.....
....	....	2¼	1¾	....	Pittsburgh Oil Dev.	.....	.....	.....	.....	.....	.....
2	1¾	2¼	2¼	5	do pfd.	.....	.....	.....	.....	.....	.....
33½	20	31	19	10	Plymouth Oil	200	19½	19½	19¼	19¼	+ ¼
7	3	6	5	5	States Oil	.....	.....	.....	.....	.....	.....
3½	2	3¼	1½	1	Texon Oil & Land	300	1½	1⅝	1½	1⅝	+ ⅛
25¾	8	23¾	18	10	Tidal Osage (non-vtg).	50	19½	19½	19½	19½	— 1½

*New high †New Low xEx-Dividend

Standard Oil Stock Traded in New York

1926 High	1926 Low	1927 High	1927 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Oct. 22 Sales	First	High	Low	Last	Change
21	16⅜	21⅝	17⅝	£ 4,000,000	£1	Anglo-American Oil	60⅓c	May 31, 27	600	18½	18⅝	18½	18⅝	+ ⅛
20¼	16½	20½	17⅜	.....	£1	do ctfs. non-voting	.....	.....	200	18½	18½	18½	18½	— ⅛
2¼	.75	1⅜	.75	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	300	1¼	1¼	1	1	0
5	2¼	4½	2½	$ 000,000	$ 10	do pfd.	.....	.....	.....	.....	.....	.....	.....	.....
75	65	69	50	1,000,000	25	Borne Scrymser	‡$1S.A.	Oct. 15, 27	.....	.....	.....	.....	.....	.....
59½	42	59	45	10,000,000	50	Buckeye Pipe Line	$1Q	Sept. 15, 27	450	56	56	55¾	56	0
82½	65	115	76½	3,000,000	25	Chesebrough Mfg.	$1Q	Sept. 30, 27	2,300	111¾	123½	111¾	120¼	+ 8½
25⅞	17½	22⅝	16¼	38,805,260	10	Continental Oil	25cQ	Sept. 15, 27	110,100	16⅞	19	16⅞	18½	+ 1⅝
137	102	137	89	3,000,000	100	Cumberland Pipe Line	$2Q	Sept. 15, 27	.....	.....	.....	.....	.....	.....
63¾	43	61	47	5,000,000	100	Eureka Pipe Line	$1Q	Aug. 1, 27	100	59½	59½	59	59	— ¾
32½	9⅛	13½	7⅛	16,000,000	100	Galena Signal Oil	.....	June 30, 25	100	7½	7½	7½	7½	— ½
94½	35	59¾	32	4,000,000	100	do new pfd.	.....	June 30, 26	.....	.....	.....	.....	.....	.....
97½	40	60½	36	2,000,000	100	do old pfd.	.....	June 30, 26	.....	.....	.....	.....	.....	.....
99⅝	52	65¼	54	73,117,577	25	Humble Oil & Refining	‡30cQ	Oct. 1, 27	11,100	61½	62¾	60	61½	+ ⅛
144½	125¼	166	123¾	20,000,000	100	Illinois Pipe Line	$6S.A.	June 15, 27	650	164½	*166	164	165	+ 1
39¾	32½	64¾	37¾	(sh) 6,491,952	N.P.	Imperial of Canada	‡25cQ	Sept. 1, 27	6,800	60¼	61	58¾	60¼	— ¾
70	54¾	79	61	$ 5,000,000	$50	Indiana Pipe Line	$1Q	Aug. 15, 27	350	75	75¼	73	73	— 3
35¼	28¾	34⅞	28	(sh) 7,118,138	N.P.	International Petroleum	25c	June 15, 27	9,500	32	32	30⅞	31⅝	+ ⅛
20¾	12½	18½	13½	$ 6,362,500	$12½	National Transit Co.	25cQ	Sept. 15, 27	4,900	16	*18½	16	17½	+ 1½
51½	27¾	37	31¼	5,000,000	100	New York Transit	.....	July 15, 26	100	34½	35	34½	35	+ ½
80½	64	91	70	4,000,000	100	Northern Pipe Line	$3S.A.	July 1, 27	.....	.....	.....	.....	.....	.....
67⅝	55¾	64¼	52	60,000,000	25	Ohio Oil Co.	‡50cQ	Sept. 15, 27	2,400	59	59¼	58	59	0
24⅜	15	31	12	10,000,000	25	Penn Mex. Fuel	.....	May 21, 25	3,800	28	30	25½	30	+ 6
60¼	48	55½	45⅜	60,000,000	25	Prairie Oil & Gas	50cQ	Aug. 31, 27	14,800	47⅛	48¾	46½	47¾	+ ⅞
137½	122¼	186	132	81,000,000	100	Prairie Pipe Line	$2.50Q	July 31, 27	1,600	179¾	180	177½	177½	— 2¼
220	184½	201½	175½	4,000,000	100	Solar Refining	$5S.A.	June 20, 27	90	182	182	†175½	175½	— 5½
27	21	27¼	15½	5,000,000	50	Southern Pipe Line	.....	Mar. 1, 26	600	22¼	22¼	21⅞	22	+ ⅛
50	34½	41½	34½	20,000,000	25	South Penn Oil	50cQ	Sept. 30, 27	1,100	36¼	36¼	36	36	— ¼
57	49	77	55½	3,500,000	100	South West Pa. Pipe Lines	$1Q	Oct. 1, 27	.....	.....	.....	.....	.....	.....
70¼	60¼	75⅞	64¾	228,415,463	25	S. O. Indiana	‡62½cQ	Sept. 15, 27	15,800	71⅞	72⅝	71¾	71½	— ⅝
36½	16½	20⅞	15⅜	8,000,000	25	S. O. Kansas	.....	June 16, 24	400	15¾	16	15¾	16	0
134¼	108	123¾	111½	17,012,599	25	S. O. Kentucky	$1Q	Sept. 30, 27	400	118¼	118½	118	118½	0
51⅛	42	49½	42	4,559,850	25	S. O. Nebraska	63cQ	Sept. 20, 27	500	43½	43½	43	43¼	— ¼
672	288	86¾	73	14,000,000	25	S. O. Ohio	62½cQ	Oct. 1, 27	650	76¼	76¼	75	76	— 1
120⅛	116½	122	117¼	7,000,000	100	do pfd.	$1.75Q	Sept. 1, 27	.....	.....	.....	.....	.....	.....
23	15⅛	21	14½	861,466	25	Swan Finch Co.	.....	Nov. 1, 19	200	18½	*21	18½	21	+ 2½
109¾	90¼	136½	95⅛	62,470,800	25	Vacuum Oil	‡50cQ	Sept. 20, 27	33,800	128½	*136½	127	133¼	+ 4½

*New high †New low xEx dividend ‡Also extras.

General Electric Co., Schenectady, N. Y. reports receiving orders totaling $233,076,091 for the nine months ended September, as compared with $246,993,637 for the corresponding period of 1926, a decrease of 6 per cent this year.

STANDARD OIL ISSUES

PIPE LINE COMPANIES

We shall be pleased to furnish information regarding these companies.

CARL H. PFORZHEIMER & CO.

Specialists in Standard Oil and Miscellaneous Oil Securities

25 Broad Street New York

New York Curb Market

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Week Ended Oct. 22 Sales	First	High	Low	Last	Change
6¾	45	2	.55	$5	Amer. Con. Oilfields	84,000	93	95	85	89	— 4
14½	4	7½	3	N.P.	Amer. Maracaibo	800	3¼	3¼	3⅛	3⅛	— ⅛
8⅜	5¾	9¾	6¾	$10	Arkansas Nat. Gas	1,800	8½	8¾	8½	8¾	— ⅛
20⅜	14⅞	20⅛	15½	N.P.	Beacon Oil	.....	.....	.....	.....	.....	.....
85¼	60	33⅜	20½	N.P.	British American	1,700	32	33½	32	32½	+ 1⅛
28⅜	9¼	28¼	14⅜	25c	Carib Syndicate(new)	4,100	19⅞	19⅞	18¼	19	— 1⅜
...	...	26	16½	...	do ctfs. of deposit	.....	.....	.....	.....	.....	.....
51	37½	58¾	40¼	$20	Cities Service	22,000	51¼	51½	50⅛	50⅜	— ⅜
92½	82⅜	95	87	100	do pfd.	2,600	93¾	94	93⅜	93⅞	0
8⅜	7⅜	8¾	7⅜	10	do pfd. B	400	8⅝	8⅝	8⅝	8⅝	0
25¼	19	29¼	22½	10	do banker's shares	100	25¼	25¼	25¼	25¼	+ 1
3½	1¾	3⅞	1¾	$1	Colombia Syndicate	500	1⅛	2	1⅛	1⅛	— 1/16
10⅛	8⅛	9½	7	10	Consolidated Royal	.....	.....	.....	.....	.....	.....
16	10	14⅞	9⅞	N.P.	Creole Syndicate	40,500	10⅜	10⅜	10	10⅛	— ⅛
7⅜	1⅛	3	63	N.P.	Crown Central	100	70	70	70	70	—25
8½	½	12	4	...	Darby Petroleum	200	5	5	†4	4	— 1¼
....	....	11½	5	...	do trust ctfs.	100	5	5	†5	5	— ¼
4	1¾	2½	1¼	N.P.	Derby Oil & Refining	.....	.....	.....	.....	.....	.....
19	13	16¾	7⅛	N.P.	do pfd.	100	7⅛	7⅛	†7⅛	7⅛	— 2⅜
7½	2½	3¾	1	N.P.	Gibson Oil	9,000	1⅞	2⅛	1⅝	2	— ⅛
2	.63	1⅜	40	N.P.	Gilliland ctfs.	1,000	40	40	40	40	— 5
98	82	96½	86¼	$25	Gulf Oil Corp.	3,100	90½	92¼	90⅜	92	+ ⅛
3⅜	1	2¼	1⅛	N.P.	Kirby Petroleum	3,500	1¼	1¼	†1⅛	1¼	0
12¼	5¾	10⅜	6	N.P.	Leonard Oil & Dev.	500	7⅜	7⅞	7⅜	7½	— ¼
27	20	27½	20½	N.P.	Lion Oil & Refg.	200	20½	20½	†20½	20½	— ⅜
46	31	53	37	$25	Lone Star Gas	6,900	49¼	*53	49¼	52	+ 2¼
2¾	2	2⅞	.87	1	Magdalena Synd.	1,100	1¼	1¼	.96	1	— ¼
5½	1⅞	3	1½	10	Mexican-Panuco	.....	.....	.....	.....	.....	.....
1¾	1¼	1¼	1	1	Mountain & Gulf	300	1	1	1	1	0
26	23	26⅞	22¾	10	Mountain Producers	3,900	23½	24⅜	23½	25⅜	+ ⅞
6¾	5	5⅞	4⅝	5	New Bradford	1,900	4⅝	4¾	4⅝	4¾	+ ⅛
11¾	2	6¼	4	10	New England Fuel	.....	.....	.....	.....	.....	.....
17	9⅛	16	9¼	1	New Mex. & Ariz.	2,900	10¼	10½	10	10¾	0
17	8	13¼	9	25	New York Oil	100	11	11	11	11	0
12⅛	8¾	12⅝	10	N.P.	North Cent. Texas	500	10⅜	10½	10	10⅜	+ ⅜
44¾	33	....	....	$25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
33	28⅛	27½	21¼	...	Okla. Nat. Gas ctfs.	.....	.....	.....	.....	.....	.....
10⅛	5⅞	9⅜	1¾	N.P.	Pandem	3,800	2⅜	3	2½	2⅞	+ ⅛
12¼	11¾	12⅞	7	N.P.	Pantapec Oil	1,100	8½	8½	8¼	8½	0
2¾	.20	.37	.25	N.P.	Peer Oil Corp.	.....	.....	.....	.....	.....	.....
22¾	12	13½	6¼	$10	Pennok Oil	.....	.....	.....	.....	.....	.....
38	14⅛	24⅜	14⅛	25	Red Bank Oil	.....	.....	.....	.....	.....	.....
30¼	12	15½	2	N.P.	Reiter-Foster	9,800	6	7	5⅞	6	— ⅛
27½	22	27½	15	$25	Richfield Oil	200	21½	21½	21½	21½	— ½
7½	4⅛	7	4½	N.P.	Ryan Consolidated	500	6	6	5⅞	5⅞	+ ¼
10	7½	8	6	$10	Salt Creek Cons.	100	6	6	6	6	— ¼
36	26⅜	32	27¼	10	Salt Creek Prod.	500	27¾	29	27½	29	+ ¾
4⅜	1⅛	7	2	5	Savoy Oil	100	2	2	†2	2	— ⅛
27	7⅝	26½	17	10	Tidal Osage	2,900	21	21½	20¾	21⅛	— ⅜
25¾	7⅝	23¾	15	10	do non-voting	5,200	19½	19½	18¼	18⅞	— ⅝
...	...	88	63½	100	Transcontinental pfd.	100	78	78	78	78	+ 4
3	4⅛	7⅜	4¼	5	Venezuelan Petrol.	1,200	5	5	4⅝	4⅞	— ⅛
31⅛	22	32⅝	20⅜	N.P.	Wilcox Oil & Gas	300	21½	21½	21⅜	21⅜	— ½
9½	4¾	8	5	$1	Woodley Petroleum	400	5	5	†5	5	— ⅛

*New High †New Low xEx Dividend